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Global infertility and the globalization of new reproductive technologies: illustrations from Egypt

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Abstract

Infertility is a problem of global proportions, affecting on average 8–12 percent of couples worldwide. In some societies, however—particularly those in the “infertility belt” of sub-Saharan Africa—as many as one-third of all couples are unable to conceive. Factors causing high rates of tubal infertility in parts of the developing world include sexually transmitted, postpartum, and postabortion infections; however, male infertility, which is rarely acknowledged, contributes to more than half of all cases. Unfortunately, the new reproductive technologies (NRTs) such as in vitro fertilization (IVF), which are prohibitively expensive and difficult to implement in many parts of the developing world, represent the only solution to most cases of tubal and male infertility. Not surprisingly, these technologies are rapidly globalizing to pronatalist developing societies, where children are highly desired, parenthood is culturally mandatory, and childlessness socially unacceptable. Using Egypt as an illustrative case study, this paper examines five of the major forces fueling the global demand for NRTs; these include demographic and epidemiological factors, the fertility–infertility dialectic, problems in health care seeking, gendered suffering, and adoption restrictions. Following this overview, a detailed examination of the implications of the rapid global spread of NRTs to the developing world will be offered. By focusing on Egypt, where nearly 40 IVF centers are in operation, this article will demonstrate the considerable constraints on the practice and utilization of NRTs in a developing country on the “receiving end” of global reproductive technology transfer. The article concludes by stressing the need for primary prevention of infections leading to infertility, thereby reducing global reliance on NRTs.

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Introduction

Infertility, or the inability to conceive, is a problem of global proportions, affecting between 8 and 12 percent of couples worldwide ([Reproductive Health Outlook, 2002](#)). In some societies, however—particularly those in the “infertility belt” of central and southern Africa—as many as one-third of couples are unable to conceive after a year or more of trying ([Cates, Farley, & Rowe,](#)

[1985](#); [Collet et al., 1988](#); [Ericksen & Brunette, 1996](#); [Larsen, 1994, 2000](#); [World Health Organization, 1987a](#)). Factors causing high rates of infertility in parts of the developing world are varied, but tubal infertility due to sexually transmitted, postpartum, postabortive, and iatrogenic infections is widely regarded as the primary form of preventable infertility in the world today ([Reproductive Health Outlook, 2002](#); [Sciarra, 1994, 1997](#)). Although rarely socially acknowledged, male infertility contributes to at least half of all cases worldwide and is often the most difficult form of infertility to treat ([Devroey, Vandervorst, Nagy, &](#)

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Van Steirteghem, 1998; Irvine, 1998; Kamischke & Nieschlag, 1998). Unfortunately, the so-called “new reproductive technologies” (NRTs) such as in vitro fertilization (IVF), which are prohibitively expensive and difficult to implement in many developing societies, are the only solution for most cases of tubal and male infertility. This is especially true in parts of the world where less invasive donor insemination (DI) technologies are religiously or otherwise culturally prohibited, particularly in countries with large Muslim populations (Blank, 1998; Meirou & Schenker, 1997). Given such cultural restrictions in the face of significant infertility problems, it is not surprising that “high-tech” NRTs to overcome tubal and male infertility are rapidly globalizing, even to resource-poor, developing countries with significant population pressures (Nicholson & Nicholson, 1994; Okonofua, 1996). In such high-fertility settings, where children are highly desired and parenthood is culturally mandatory, infertility is a socially unacceptable condition, leading most infertile couples on a relentless “quest for conception” that may eventually involve resort to NRTs (Inhorn, 1994, 2003).

In many societies around the world, infertility is an especially disruptive form of “reproduction gone awry.” The lack of pregnancy and the resulting childlessness are often highly stigmatizing, leading to profound social suffering for infertile couples and infertile women in particular (Sciarrà, 1994; Van Balen & Gerrits, 2001; Van Balen & Inhorn, 2001). Yet, rarely has infertility been acknowledged as a serious public health problem in the purportedly overpopulated non-Western world. As a result, few non-Western societies have incorporated the diagnosis and treatment of infertility into their family planning programs, meaning that state-sponsored infertility care remains marginal at best and generally does not include access to or coverage of NRT services (Van Balen & Gerrits, 2001). Yet, adoption—perceived in the West as the “natural” (even if last-resort) solution to infertility—may be culturally or legally unacceptable in many developing societies and may, therefore, not represent a way to solve this intractable problem (Inhorn, 1996).

This article examines infertility as an important global health problem—one that has been largely unappreciated and understudied from both a biological/clinical and social science perspective (Bentley & Mascie-Taylor, 2000; Hamberger & Janson, 1997; Schroeder, 1988; Sciarrà, 1994; Van Balen & Gerrits, 2001; Van Balen & Inhorn, 2001). Although infertility is beginning to be recognized as part of the broadly defined global reproductive health agenda emerging out of the 1994 United Nations International Conference on Population and Development in Cairo, no guidelines have yet emerged on how to translate “prevention and appropriate treatment of infertility, where feasible” into concrete strategies, particularly in resource-poor devel-

oping countries (Van Balen & Gerrits, 2001, p. 216). Furthermore, many of the infertility studies sponsored by the World Health Organization (WHO), as well as the clinical guidelines emerging from those studies, are now seriously dated (WHO, 1975, 1987a, b, 1989, 1991, 1993), and their impact on the prevention and treatment of the global infertility problem has been marginal (Sundby, 2001).

This article uses the case of Egypt—the site of the UN population conference and of the author’s own field research over 15 years—to illustrate why infertility deserves serious recognition as a major global health issue. As will be argued here, it is the very severity of the global infertility problem that underlies the now massive global spread of NRTs to places like Egypt. In particular, this article will examine the five major forces fueling the global demand for NRTs. These include demographic and epidemiological factors; the fertility–infertility dialectic; problems of health care seeking; gendered suffering; and adoption restrictions. Following an overview of these issues, this article will focus specifically on the implications of NRT globalization to the developing world, including Egypt. As we shall see, Egypt has been the site of unprecedented NRT development, with nearly 40 IVF centers in operation by the end of the 1990s, including one state-sponsored public IVF center at the University of Alexandria. However, as a Third World society on the “receiving end” of global reproductive technology transfer, Egypt represents an ideal case study for questioning the Western assumption that NRTs—as supposedly “neutral,” “culture-free” medical technologies to overcome tubal, male, and other forms of infertility—can be “appropriately” transferred anywhere and everywhere. As this article will demonstrate, major constraints on the practice and utilization of NRTs are being enacted on the local level in Egypt, demonstrating the very local cultural and structural implications of global reproductive technology transfer.

The global demand for new reproductive technologies

Demography and epidemiology

To understand the global demand for new reproductive technologies, one must consider the numbers: Namely, infertility is a global health issue that affects millions of people worldwide. In fact, no society can escape infertility; some portion of every human population is affected by the inability to conceive during their reproductive lives. The classic definition of infertility is as follows: “For couples of reproductive age who are having sexual intercourse without contraception, infertility is defined as the inability to establish a pregnancy within a specified period of time, usually one year”

(Sciarrà, 1994). Given this definition, it is estimated that between 8 and 12 percent of couples experience some form of infertility during their reproductive lives (Reproductive Health Outlook, 2002; Rowe & Farley, 1988). Extrapolating to the global population, this means that 50–80 million people may be experiencing infertility at any given time (Sciarrà, 1994).

As suggested earlier, infertility is highly prevalent in some parts of the developing world, particularly sub-Saharan Africa, which is said to have an “infertility belt” wrapped around its center (Leonard, 2001). As shown in a major epidemiologic survey of 27 sub-Saharan African nations, the prevalence of infertility actually varies widely both *between* and *within* countries (Erickson & Brunette, 1996), with national averages ranging from 12.5 to 16 percent. However, infertility prevalence rates in several eastern African countries (e.g., Burundi, Uganda, Rwanda) are considerably lower (8–13 percent) and rates in southern Africa (e.g., Botswana, Madagascar, Namibia, Zimbabwe, Lesotho) are considerably higher (15–22 percent). Furthermore, these national rates mask large *regional* and *ethnic* differences in infertility prevalence. In Namibia, for example, infertility prevalence rates for some ethnic groups reach as high as 32 percent, or one-third of all couples attempting to conceive.

General infertility prevalence rates also mask differences between *male* and *female* infertility. The most comprehensive study of infertility to date—a WHO study of 5800 infertile couples seeking help at 33 medical centers in 25 developed and developing countries between the years 1979 and 1984 (Cates et al., 1985; World Health Organization, 1987a, b)—found that men were either the sole cause of infertility or a contributing cause of infertility in more than half of all couples. Two of the major male factors are azoospermia (lack of sperm in the ejaculate) and oligospermia (low sperm count). Yet, the etiology of these problems is poorly understood, as they are not clearly linked to any one factor such as infection (Irvine, 1998). Furthermore, standard treatments (e.g., hormones, testicular surgeries) have proven unsuccessful (Devroey et al., 1998; Kamischke & Nieschlag, 1998). Despite the high prevalence of male infertility, infertility is paradoxically considered to be a “woman’s problem” around the world (Inhorn & Van Balen, 2001), and thus the role of male infertility is vastly underestimated and even hidden in many societies (Inhorn, 2002).

General infertility prevalence rates also mask differences between so-called *primary* and *secondary* infertility. According to WHO guidelines, primary infertility means that infertility occurs in the absence of a prior history of pregnancy, while secondary infertility means that infertility occurs *following* a prior pregnancy. The aforementioned WHO multinational study (Cates et al., 1985; World Health Organization, 1987a, b) found that

most infertile couples worldwide suffer from primary infertility. In fact, with the exception of Africa, there seems to be a core of about 5 percent of couples in most societies who suffer from anatomical, genetic, endocrinological, and immunological problems resulting in primary infertility (Reproductive Health Outlook, 2002). The remainder of cases, including most of the cases of secondary infertility, are due to preventable conditions. What are they?

Reproductive tract infections (RTIs), most of which are sexually transmitted, are the leading preventable cause of infertility (Sciarrà, 1994). The WHO multinational study found that 85 percent of infertile women in sub-Saharan Africa had diagnoses that could be attributed to RTIs, about double the rate for other regions of the world (Cates et al., 1985). RTIs, including those caused by gonorrhea or asymptomatic genital chlamydial infections, can lead to pelvic inflammatory disease (PID), which results in tubal scarring and blockage. The end result is tubal infertility, which is often treatable only by IVF—a new reproductive technology that was, in fact, developed largely to bypass the need for healthy fallopian tubes (Sciarrà, 1994).

In the developing world, tubal infertility is highly prevalent and the major cause of secondary infertility. In sub-Saharan Africa, for example, the elevated levels of secondary infertility—affecting as many as one-quarter of all women in some societies—are clearly due to infection-induced tubal infertility (Caldwell & Caldwell, 2000; Cates et al., 1985; Larsen, 2000). Rates of secondary infertility in Latin America are also high (40 percent of all infertility cases, as compared to 23 percent in Asia and 16 percent in North Africa). Most secondary infertility among women is due to four sets of factors: (1) sexually transmitted infections; (2) postpartum complications; (3) postabortive complications; and (4) other unhygienic health care practices carried out in either the biomedical or traditional health care sectors.

Finally, it is increasingly being recognized that some cases of infertility are attributable to dietary or environmental toxins (Hamberger & Janson, 1997). Dietary deficiencies of iodine and selenium have been linked to infertility in the developing world (Longombe & Geelhoed, 1997; Stewart, 1991), as have exposures to dietary aflatoxins (fungal metabolites that commonly contaminate staple foods in tropical countries) (Ibeh, Uraih, & Ogonar, 1994). Furthermore, smoking, alcohol, and caffeine consumption—all of which are highly prevalent in parts of the developing world—have been linked to decreased fertility in either males or females or both (Curtis, Savitz, & Arbuckle, 1997; Reproductive Health Outlook, 2002). In addition, female obesity, an increasing problem among some poor urban populations in the developing world, may be linked to ovulatory infertility (Inhorn, 1994). Increasingly, it is being recognized that men and women in developing

countries who are faced with exposure to environmental and occupational toxicants may be at risk of infertility outcomes. Toxicants of concern include arsenic, heavy metals such as lead, solvents, pesticides, and industrial chemicals (Bell & Thomas, 1980; Mattison et al., 1990). In some cases, class-action legal suits have been brought against various multinational corporations by male workers who have been made sterile by their exposure to synthetic pesticides at their places of work—the most famous case being that of dibromochloropropane (DBCP), which has clearly been shown to cause male sterility (Daniels, 1997).

All of these factors seem to be at play in Egypt, the site of my own research. A recent WHO-sponsored community-based prevalence study of infertility, based on a random sample of married women aged 18–49 in 20,000 rural and urban Egyptian households, placed the total infertility prevalence rate at 12 percent, with 4.3 percent of cases suffering from primary infertility and 7.7 percent from secondary infertility (Egyptian Fertility Care Society, 1995). Studies carried out in the 1980s and 1990s show tubal infertility to be the leading cause of infertility in the country (Inhorn, 1994; Serour, El Ghar, & Mansour, 1991). Pelvic infections leading to tubal infertility in Egypt are attributable to a number of causes, including STDs, postpartum and postabortive infections, postoperative adhesions following pelvic surgery, pelvic tuberculosis and schistosomiasis (common infectious diseases in Egypt), and a number of iatrogenic traditional and biomedical practices, including the widespread use of infection-inducing intrauterine devices (IUDs) for contraception (Khattab, Younis, & Zurayk, 1999). In a medical anthropological/epidemiological research project I carried out among 100 infertile Egyptian women and 90 fertile controls (Inhorn & Buss 1993),¹ women appeared to be at significant risk for

tubal-factor infertility from a number of iatrogenic sources, including traditional female circumcision practices, as well as outdated and inefficacious biomedical practices (i.e., tubal insufflation, cervical electrocautery, dilatation and curettage) commonly employed by Egyptian gynecologists to supposedly *treat* infertility. In addition, serum antibodies to chlamydia trachomatis were found among one-third of 150 women tested, suggesting significant rates of undiagnosed STDs in this population. Furthermore, in a study examining male infertility outcomes (Inhorn & Buss, 1994), Egyptian men's exposures to high heat and chemicals in the workplace, history of schistosomiasis infection, and male smoking (particularly of waterpipes) seemed to place them at risk for male infertility outcomes. In a more recent study carried out in Egyptian IVF centers (Inhorn, 2002), male infertility was the most common form of infertility among couples presenting to these centers, a pattern that has continued into the new millennium (Mohamed Yehia, personal communication).²

In summary, most cases of tubal infertility and most cases of serious male infertility in Egypt and elsewhere are virtually impossible to overcome without the special assistance of NRTs. Given that rates of tubal and male infertility are significantly higher in the developing world than they are in the West, it should come as no surprise that Third World couples who can afford these new technologies will attempt to access them in order to overcome their childlessness. In theory, the demand for these technologies is almost limitless in the non-Western world, given the millions of infertile Third World couples whose childlessness is insoluble through any other means. Thus, while Western scholars have focused their attention almost exclusively on the use of NRTs in Europe and North America (Van Balen & Inhorn, 2001), perhaps the most intriguing sites for future investigation of NRTs lie elsewhere—in societies such as Egypt, Cameroon (Feldman-Savelsberg, 1999, 2001), India (Bharadwaj, 2001), and China (Handwerker, 2001), where the sheer magnitude of the infertility problem, both demographically and epidemiologically speaking, is daunting.

The fertility–infertility dialectic

The major paradox of infertility is that its prevalence is often greatest in those areas of the world where

¹In the late 1980s during the “early period” of IVF in Egypt, I conducted 15 months of anthropological fieldwork on the problem of infertility in Egypt, basing my research in the University of Alexandria's large, public, ob/gyn hospital, popularly known as “Shatby,” which was initiating the only public IVF program in the country. There, I conducted in-depth, semi-structured interviews in the Egyptian colloquial dialect of Arabic with 100 infertile women and a control group of 90 fertile ones, the vast majority of whom were poor, uneducated, illiterate housewives. Because of my interests in reproductive epidemiology, these interviews incorporated detailed reproductive histories. Returning to Egypt in the mid-1990s during the “IVF boom period” in Egypt, I spent the summer of 1996 conducting in-depth, semi-structured interviews with 66 mostly middle- to upper-class, highly educated, professional women in two of the most well-established private IVF centers in Cairo. In 40 percent of these interviews (in marked contrast to my earlier research), husbands were present and participated, often enthusiastically, in interviews, about half of which were in Arabic and half in English.

²According to Mohamed Yehia, medical director of the Nozha Hospital IVF Center in Cairo, Egypt, more than 70 percent of all couples presenting to his clinic today are affected by male infertility. This may represent a backlog of long-term male infertility cases, who are now presenting to IVF centers in order to access new reproductive technologies for male infertility.

fertility is the highest—the phenomenon of so-called “barrenness amid plenty” (Sciarra, 1994; Van Balen & Gerrits, 2001). However, the explanation for this paradoxical situation is relatively straightforward: Because children are greatly desired in high-fertility, pronatalist societies, women do not regularly contracept, thereby exposing themselves, usually unwittingly, to the risk of sterilizing infections from STDs, unsafe abortions, and postpartum infections following pregnancy. Thus, problematic high fertility exists in a relationship of tension and contrast to problematic high infertility—a situation that I have characterized in my own work as “the fertility–infertility dialectic” (Inhorn, 1994).

In fact, investigating infertility in resource-poor, high-fertility countries may shed significant light on issues of fertility, for infertility provides a convenient lens through which many fertility-related behaviors and beliefs can be explored. These include, *inter alia*, ideas about conception and how it is prevented both intentionally and unintentionally; understandings of, attitudes toward, and practices of contraception; beliefs about the importance of motherhood, fatherhood, and children themselves; and perceptions of risk and risk-taking regarding the body and its reproductive processes.

To take but a few examples, anthropological studies from around the world demonstrate widespread fears of hormonal contraceptives as agents that may actually cause infertility (Okonofua, 1996; Van Balen & Inhorn, 2001); this fear of hormone-induced infertility may actually keep many individuals from participating in family planning programs in pronatalist societies such as Egypt, where children are highly desired for numerous reasons (Inhorn, 1994, 1996). Alternately, these fears of hormonal contraceptives may lead women in places like Egypt to accept IUDs as a preferable form of modern contraception. However, recent studies of reproductive morbidity in Egypt have shown how widespread IUD use is partly responsible for the high rates of secondary infertility from sterilizing infection (Khattab, Younis, & Zurayk, 1999).

Furthermore, infertile women and men, because they desire procreation, do not use barrier methods of contraception, thereby exposing themselves to the risk of sterilizing STDs and life-threatening HIV/AIDS. In fact, infertile women are at significantly increased risk of HIV infection in the developing world, especially Africa (Boerman & Mgalla, 2001; Favot et al., 1997; Samucidine, Barreto, Folgosa, Mondlane, & Bergstrom, 1999), where infertility along with HIV represent twin threats for *depopulation* in some areas.

Despite the intimate connection between problems of infertility and fertility, the control of infertility is rarely incorporated into programs of population control and family planning in developing countries (Hamberger &

Janson, 1997). To wit, most societies in the developing world are considered by population analysts to be overpopulated and in need of population reduction and control. In view of this situation, infertility is considered a trivial problem, and is even regarded as a *solution* to overpopulation by some callous Western observers (who have pointed this out to me and other infertility researchers many times). In only a few developing countries have government agencies and clinics started to formulate policy and guidelines for the treatment of infertility, including regulations for the institutionalization and use of NRTs (Okonofua, 1996; Rowe, 1999).

Egypt is no exception to this rule. Egypt was the first Middle Eastern Muslim country to establish a national population program (through family planning) in the 1960s (Stycos, Sayed, Avery, & Fridman, 1988). However, as in the vast majority of the world’s societies, infertility was not included in this program as either a population problem, a more general public health concern, or an issue of human suffering for Egyptian citizens, especially women. Although Egypt has an extensive system of government-sponsored maternal and child health clinics, these clinics do not routinely offer infertility diagnosis or treatment. With the exception of one or two government-sponsored infertility clinics at urban, university-based, public teaching hospitals, infertility care, including provision of NRTs, remains entirely in the private domain—suffered in private by those who are unable to conceive, who must place their fertility and futures in the hands of private physicians, who view infertile patients as “money-makers” for their practices and often do not have the best interests of these patients at heart (Inhorn, 1994, 2003). This same story—namely, the lack of “political will” to place infertility on the *public* health agenda—means that infertility treatment services in the Third World today are largely *privatized*, with untoward consequences for treatment access, particularly to NRTs.

Health-care seeking

Given the sheer numbers of infertile persons worldwide, it should come as no surprise that infertility is a leading cause of health-care seeking in many developing countries. Yet, because infertile individuals in the developing world are major users of health care systems, they may “drain” limited resources from health care systems that are literally unprepared to help infertile patients with what are often intractable infertility problems (Okonofua, 1996). Studies from around the world have shown that infertile women—and increasingly men—are massive users of biomedical health care services (Van Balen & Gerrits, 2001). In Nigeria, for example, infertility is estimated to be the leading reason for gynecological consultations (Okonofua, 1996).

Similarly, in Egypt, most gynecologists estimate that one-third or more of their patients are seeking infertility services (Inhorn, 1994). Among Egyptian andrologists, or physicians who specialize in male reproductive and urological complaints, male infertility accounts for 50–60 percent of all patient visits (Mohamed Yehia, personal communication).

In addition, in many developing societies, infertile individuals may seek help from a variety of so-called “traditional” healers. These include, among others, herbalists, lay midwives, spiritual healers, diviners, and religiously affiliated healers of various types. As noted by Van Balen and Gerrits (2001, p. 217), “Regarding traditional healers ... it is sometimes said that they have some advantages over Western-style medical and paramedical personnel. They use traditional, long-established medicines, know the people of the area, are often famous and trusted persons, speak the local language, and live according to the same culture.” Thus, as they point out, infertile individuals may seek help from such healers rather than, or in addition to, Western-style biomedical specialists, who often “distance” their patients in various ways.

The resort to both traditional and modern forms of infertility therapy, often simultaneously, is typical for poor, urban Egyptian women as they attempt to overcome their infertility in a complex, medically pluralistic setting. In Egypt, there is literally a 5000-year history of shifting medical traditions, which continue today in the form of a rich corpus of “ethnogynecological” beliefs and practices (Inhorn, 1994). Egyptian women, especially of the lower class, draw upon these traditions at the same time as they pursue remedies in the world of contemporary Egyptian biomedicine. Unfortunately, much of the contemporary “biogynecology” practiced in Egypt—which is rooted in British colonial medical traditions (Sonbol, 1991)—is largely outdated and even iatrogenic, or productive of further infertility problems in female patients seeking infertility treatments (Inhorn & Buss, 1993, 1994). Thus, many infertile Egyptian women who are “searching for children,” as they call their quest for conception, actually suffer at the hands of biomedical practitioners. Such biomedical iatrogenesis has been documented at other sites in Africa as well (Mogobe, 2000; Sundby, 1997; Van Balen & Gerrits, 2001).

In short, studies from around the world demonstrate “how little formal health services have to offer to the majority of the infertile people in developing countries” (Van Balen & Gerrits, 2001, p. 216). Yet, individuals who are infertile in pronatalist societies usually experience profound human suffering, and thus are often willing to do anything, even risking their own lives in the pursuit of physically risky remedies, in their efforts to conceive. Increasingly, this pursuit of pregnancy involves resort to NRTs, particularly in light of the failure

of biomedicine to prevent or cure infertility in the developing world.

Gendered suffering

Given the global prevalence of infertility and the difficulty of overcoming it through standard treatment regimens, it is not surprising that infertility leads to profound human suffering on a global scale. The burden of suffering and stigma, furthermore, generally rests on the shoulders of women, whether or not they are the infertile partner (Hamberger & Janson, 1997; Sciarra, 1994). Women worldwide appear to bear the major burden of infertility, in terms of blame for the reproductive failing; personal anxiety, frustration, grief, and fear; marital duress, abuse, divorce, polygamous remarriage, or abandonment; and social stigma and community ostracism (Van Balen & Inhorn, 2001). As noted by Sciarra (1994, pp. 155–156), past president of the International Federation of Gynecology and Obstetrics (FIGO), the social stigma of infertility can have lifelong consequences, “affect[ing] a woman for the remainder of her life, preventing subsequent marriage, and making her economically vulnerable.”

Anthropological studies from around the world have increasingly demonstrated the gendered suffering accompanying infertility, particularly when motherhood is the only way for women to enhance their status within the family and community (Boerma & Mgalla, 2001; Inhorn & Van Balen, 2001; Van Balen & Gerrits, 2001). In societies ranging from Mozambique (Gerrits, 1997, 2001) to Laos (Liamputtong-Rice, 2000), infertile women are often excluded from the everyday social events and ceremonies typically involving mothers and children. In some societies, including Egypt, infertile women are even suspected of harming others’ children through their uncontrollable envy and casting of the evil eye. Furthermore, childless women are particularly vulnerable in their old age in societies in which the elderly are typically supported and nursed until death by their grown children.

In my own research in Egypt, I have asked what happens to Egyptian women who are unable to become pregnant in an emphatically pronatalist, child-loving society. Framing my findings under the rubric of patriarchy, as defined by Middle Eastern feminist theorists, I have examined how patriarchy, or gender oppression, is “lived” by poor urban infertile women on a number of levels (Inhorn, 1996). Infertility casts doubt on a woman’s gender identity, preventing her from achieving full status as an adult woman and marrying her personhood in various untoward ways. Infertility also complicates marital dynamics, leading to marital instability in many cases and, occasionally, divorce or polygamous remarriage. However, the stigmatization and ostracism of infertility are often experienced by

women most profoundly in their relationships with in-laws and community members, who may harass infertile women to seek treatment and otherwise torment them, especially if they happen to co-reside in the same household. Because motherhood is a mandatory status for Egyptian women—even those who are highly educated and professionally successful—women who are unable to achieve entrance into the “cult” of motherhood and domesticity (Bouhdiba, 1985) experience their infertility profoundly in the forms of isolation, loneliness, and despair. These social effects, furthermore, appear to be increasing with the rise of Islamism, or so-called “fundamentalism” in the country. As Islamically inspired pronatalism and public support for woman’s domesticity become more and more pronounced in Egypt (Abu-Lughod, 2002), Egyptian women who are unable to contribute to the “Islamic multitude” experience their “barrenness amid plenty” even more acutely (Inhorn, 1996).

Adoption restrictions

Unfortunately, alternatives to biological parenthood—such as voluntary childlessness or adoption—are unacceptable in many developing societies. Although Westerners often tout adoption as the “natural” solution to childlessness, adoption restrictions, both formal and informal, are found throughout many societies of the world. For example, in the Islamic world, the Qur’an explicitly prohibits adoption, whereby an orphaned child becomes a legal “son” or “daughter” through adoption of the parents’ (usually the father’s) surname. This kind of legal but fictive kinship relationship is expressly forbidden in Islam (Serour, 1992, 1996; Sonbol, 1995), which gives legal precedence to “purity of lineage” and the “known” parenthood of all children. Although the Qur’an encourages the kind treatment and upbringing of orphans—who are available in many Muslim countries for permanent legal fostering arrangements—widespread cultural resistance to bringing up a “stranger” persists in many Muslim countries such as Egypt. Indeed, in Egypt, prohibitions against adoption often have less to do with religion than with numerous deep-seated cultural anxieties biasing Egyptians of all social classes against this practice. These include fears that (1) illegitimate children, who can be assumed to be of “bad blood,” are innately immoral beings; (2) birth parents will come to reclaim the adopted child; (3) feelings of emotional affinity and kinship between parents and adopted children will not emerge; (4) erotic attraction will develop between “real” and adoptive siblings or between adoptive parents and children; (5) adoptive children will be stigmatized within the family and community; (6) adoptive parents, and particularly mothers, will be stigmatized for being unable to produce a “real” child; and (7) finally, adoption is not available

to poor people (although this is not true) (Inhorn, 1996). Given these popular convictions, it is not surprising that few infertile couples in Egypt—and particularly elites, who are not allowed under Islamic inheritance laws to pass on their wealth to adopted children—have ever seriously contemplated parenting an orphaned child (Inhorn, 2003).

In other parts of the world, particularly parts of Africa and Oceania, adoption in the form of informal fostering arrangements, usually of relatives’ children, is quite common and is viewed as a partial solution to infertility (Gerrits, 2000; Ngwafor, 1994; Savage, 1992). However, in Africa, the number of AIDS orphans has now exceeded the supply of foster parents, including infertile ones (who may themselves be dying of AIDS), leading to a surfeit of literally unparented orphans in many central and southern African countries. In other parts of the world, including parts of Latin American and Asia, “excess” babies—born out of wedlock to teenaged mothers, born to poor families, exceeding state-mandated birth quotas, or undesired because they are female—are “marketed” at high costs to infertile Western couples (Jenkins, 2001), who are sometimes accused of being greedy exploiters of disadvantaged Third World women (Raymond, 1993). Yet, Western couples who have suffered through infertility also have legitimate desires for children that may not be met by NRTs or local adoption agencies. Thus, as with the fertility–infertility dialectic, problems of global infertility are intricately related to problems of global adoption—including transnational movements of children—in ways that highlight the politics of disrupted reproduction in all their global complexity.

Globalization of new reproductive technologies: illustrations from Egypt

Given the aforementioned issues in the developing world, it should come as no surprise that high-tech reproductive technologies are being marketed to and consumed by those in the developing world on a massive scale. For example, as early as 1994, two Argentine IVF physicians published a multinational study from Latin America examining IVF activity and success rates in 45 IVF centers throughout the region (Nicholson & Nicholson, 1994). At that time, Argentina already had 16 IVF centers, but Brazil’s seven IVF centers were most active in terms of total numbers of procedures initiated. Overall, pregnancy rates were on the order of 20 percent per cycle—comparable to Western figures. However, the authors suggested that there were complex legal and cultural issues that had yet to be examined in this predominantly Catholic area of the world.

A small but growing number of non-Western physicians—some of them IVF specialists—have adopted a

critical stance toward this wholesale exportation of Western-generated new reproductive technologies into the developing world (Okonofua, 1996; Serour, El Ghar, & Mansour, 1991; Sheth & Malpani, 1997). Despite their acknowledgement of the social suffering experienced by infertile women in these settings, they argue that new reproductive technologies (1) are less likely to be feasible and successful when carried out under Third World conditions, marked by lack of technical expertise among staff, chronic shortages in supplies, and dependence on operating materials from foreign countries; (2) pose safety issues for women and children, including increased risks of twins and higher-order multiple pregnancies, low birthweight babies, perinatal mortality, ectopic pregnancy, and risks of ovarian hyperstimulation due to superovulation by fertility drugs; (3) pose high costs, including costs of establishing programs, running individual treatment cycles, treating complications, and dealing with more complex procedures (such as high-risk obstetrical care) in women who do become pregnant. Whereas the real cost for each live test-tube birth in the US is estimated at about \$50,000, in a developing country setting, that cost could reach as high as \$100,000 (Okonofua, 1996). If IVF services are provided entirely by the private sector, then new reproductive technologies will benefit only a small proportion of infertile women, primarily elites, who can afford the costs associated with this technology. If, on the other hand, government subsidies are used to cover some or all of the costs of treatment, all taxpayers end up shouldering the burden of a service that benefits only a few, and funds are diverted from other high priority health problems, such as HIV/AIDS, which has become a pressing problem in many parts of the Third World.

Despite these warnings, NRT services have continued to expand at a rapid pace, reaching even the most underdeveloped countries. This global spread of NRTs is extremely evident in the nearly 20 nations of the Muslim Middle East. There, NRTs have reached even the smallest, “petro-rich” Arab Gulf countries, such as Bahrain and Qatar, as well as larger but much less prosperous North African nations, such as Morocco and Egypt. Egypt provides a particularly fascinating locus for investigation of this global transfer of NRTs. Although it is a resource-poor, overpopulated Middle Eastern nation, Egypt has been the undisputed leader of NRT development in the Middle East, opening its first IVF center in 1986, expanding to nearly 10 centers by 1996, and eventually hosting more than 35 IVF centers in full operation or development by 1999 (Mohamed Yehia, personal communication). Perhaps ironically, Egypt now boasts more IVF centers than any other Muslim or non-Muslim country in the region, including neighboring Israel, which has 24 IVF centers (or the highest per capita number in the world) (Kahn, 2000).

However, this is where an anthropological perspective becomes very useful, because these NRTs are not transferred into cultural “voids” when they reach places like Egypt. Local considerations, be they cultural, social, economic, or political, shape and sometimes curtail the way in which these Western-generated technologies are both offered to and received by non-Western subjects. Examining the structural and cultural constraints facing IVF consumers wherever these technologies spread clearly serves to deconstruct the myth that the NRTs are some sort of “panacea” for infertility wherever it occurs.

Even though NRTs, which are now the primary focus of infertility treatment in the West, are being rapidly introduced into developing societies, they are clearly not the “perfect solution” for overcoming the global infertility problem described above. As we shall see in the Egyptian case that follows, serious constraints on the use of NRTs in developing societies may limit the efficacy of such high-tech solutions to the global infertility problem. By examining how these globalizing reproductive technologies have been received in non-Western sites such as Egypt, we can begin to assess the costs and the benefits of this globalization process on the local level—that is, for real people attempting to grapple with both their infertility *and* with their desires to overcome it, using the newest, most modern health technologies.

In the case of Egypt in particular, infertile women and men willing to consider the use of new reproductive technologies are confronted with eight major “arenas of constraint”—or various structural, ideological, social relational, and practical obstacles and apprehensions surrounding the use of these technologies.³ Some of these, such as the physical risks and low success rates associated with IVF and related technologies, are similar to those faced by Western users of NRTs. However, as I will argue here, many of the dilemmas experienced by Egyptian IVF consumers are deeply embedded in local cultural understandings and practices. Based on my studies of IVF carried out in urban Egypt in 1988–1989 and again in 1996, I will highlight here four arenas of constraint, ranging from local understandings of reproductive biology, to significant class-based barriers to access, to gender dynamics within marriage, to local versions of Islam, which legislate upon the appropriate use of these technologies and thus restrict how “babies of the tubes,” as they are called in Egypt, are to be made.

³The eight major arenas of constraint are: class, knowledge, religion, providers, efficacy, embodiment, gender, and stigma. They are described in further detail in Inhorn (2003).

Knowledge and belief

Perhaps one of the most fundamental cultural constraints on the acceptance of the new reproductive technologies in Egypt has to do with deeply embedded beliefs about the nature of the human reproductive body and reproductive physiology. Namely, the now widely held Western version of procreation involving duogenetic inheritance through equal contributions of eggs and sperm (Martin, 1991) is *not* the cultural script of procreation understood by most Egyptians. Instead, among the poorly educated, often illiterate Egyptian masses, consisting of urban and rural poor, views of procreation are decidedly “monogenetic” (Delaney, 1991): namely, men are thought to carry preformed fetuses in their “worms,” as sperm are called among the Egyptian poor. Women are not deemed to be contributors of biogenetic substance, but rather serve to carry, “cushion,” or perhaps “nourish” the growing fetus with menstrual blood. Indeed, the notion of women having “eggs” is seen as ludicrous and unthinkable—equating, as it would, human females with chickens!

Given such differences in knowledge and belief, biomedically oriented infertility treatment is typically deeply disturbing and even threatening for both Egyptian men and women. These treatments require men to ejaculate their fetus-carrying sperm into test tubes and other containers, and women to take powerful hormonal medications to stimulate their “egg” production. The new reproductive technologies such as IVF take such manipulation of procreative materials several steps further, requiring that both ova and sperm be “harvested” from the body, sometimes surgically, and that embryos formed through *in vitro* fertilization in a laboratory be placed back inside a woman’s body. As such, this technology challenges the most basic precepts of monogenetic procreation envisioned by most uneducated Egyptians. Such challenges to monogenesis include: (1) that women have eggs that can be removed from and later returned to their bodies in a different form; (2) that women’s eggs contribute material to the creation of offspring, thereby giving women biological “ownership” of their children in their own right; (3) that men do *not*, in fact, contribute “everything” to procreation if their sperm are made to “combine” with women’s eggs; (4) that men’s sperm and women’s eggs may somehow be of equal weight in biogenetic inheritance, a form of equality questioned by even more educated Egyptians; and (5) that this combination of eggs and sperm can occur outside the body, separate from the “bringing” of children through male-organic, penetrative sex.

Furthermore, questions about what happens to such procreative materials during the period in which sperm and eggs are “*in vitro*”—literally, outside the body—are

deeply troubling to Egyptians of all social backgrounds. Among the less educated, futuristic fantasies of babies lingering for months in aquariums or giant test tubes abound, making such “extracorporeal” pregnancies decidedly “unnatural” and against God-given plans for pregnancy and birth (cf Paxson, this issue). But even among highly educated elites, fears of the morally illicit mixing of procreative substances in IVF laboratories are major sources of anxiety, keeping at least some dubious infertile couples from proceeding with IVF. Thus, such beliefs and understandings will probably continue to serve as one of *the* most fundamental impediments to the use of the NRTs for many years to come, especially among poor, poorly educated Egyptians, but also among some middle- to upper-class infertile couples.

Class

This brings us to the second arena of constraint: namely, social class and specifically economic poverty among a large percentage of both urban and rural Egyptians (Singerman & Ibrahim, 2001). Without question, the NRTs are absolutely unaffordable for most poor and even middle-class infertile Egyptians, even though they may be aware and highly desirous of such treatments. With only one exception, all Egyptian IVF centers today are *private* concerns, charging comparatively high prices for the procedures and drugs that patients pay for out-of-pocket—since health insurance in Egypt is new and not widespread (Kandela, 1998). The one exception to this rule is the University of Alexandria’s Shatby Hospital, where I conducted my initial research on infertility in the late 1980s. Shortly after I left Egypt, Shatby Hospital did open its own IVF center, and the first Alexandrian “baby of the tubes” was born and heralded in the Egyptian media in early 1992. However, since those early publicity-driven days of “free,” government-sponsored IVF, fewer and fewer test-tube babies have been born to poor Egyptian women. As Egypt’s one and only *public* IVF program, the Shatby Hospital IVF clinic continues to run, but on such a low volume that very few patients receive treatment and success rates are compromised. For the most part, the academic physicians charged with running this public clinic put their energies into their *private* IVF practices—which, as is typical for Egyptian physicians working in the public sector, they run “on the side.”

The Egyptian doctors who own and operate private IVF clinics comprise a small, elite corps of highly educated and biomedically sophisticated reproductive medicine specialists. Most of them have utilized their own economic resources to seek training in IVF in either Europe or the US. And, although many of these physicians have some sympathy for less affluent patients, occasionally taking on IVF charity cases, they

generally feel justified in charging high prices for their services and subsequently purchasing the lifestyles—including, in some cases, chauffer-driven BMWs and Mercedes-Benzes—that the profit from these services brings to them. Not surprisingly, their patients also tend to be educated elites, who are sophisticated about their medical options and can afford to pay for high-tech therapies. In a society where the majority of women remain illiterate and do not work in the formal sector, the women patients who present to IVF clinics today tend to be highly educated professionals, who are employed as doctors, lawyers, architects, engineers, accountants, bankers, professors, tourism officials, and even movie stars. Furthermore, many of these women and their husbands are members of the Egyptian “brain drain” generation; namely, they increase their wealth by working in the petro-rich Arab Gulf countries, returning home annually on month-long summer vacations in order to undertake one trial of IVF.

In other words, over a relatively short time span of a decade, the IVF scene in Egypt—once touted as being open to even the poorest public-hospital patients—has become extremely class-based and exclusionary, the arena of a handful of elite doctors and their high-class patients. This does not mean that elites—both doctors and patients—are without feeling for the poor and even middle-class women who cannot afford IVF therapy. However, many women stated matter-of-factly during interviews that these therapies are “not for everyone”—the “everyone” in this case tacitly meaning poor women, who are often known to wealthy women only in their capacity as domestic servants. Indeed, echoed in this exclusionary discourse is the same kind of bias which, as some have argued (Schroeder, 1988; Steinberg, 1997), underlies much Western discourse on the NRTs. Namely, the new reproductive technologies to combat infertility should *not* be “for everyone,” because, as the equation goes, those who cannot afford these technologies certainly cannot “afford children.” To wit, poor women do not deserve to be mothers—and especially not “test-tube mothers.” And any reproductive technology directed at them should be to inhibit—not facilitate—their fertility.

Gender

Even though some Egyptian elites may think this, they themselves may be limited in their avenues to IVF, for reasons having little to do with social class and subsequent access to new reproductive technologies. In addition to class-based constraints, gender relations and marital dynamics come into play when Egyptian wives and husbands, together or alone, seek IVF services.

As noted earlier, infertile Egyptian women of all social classes live in fear that their marriages will “collapse,” for Islamic personal status laws consider a wife’s

barrenness to be a major ground for divorce. Although Islam also allows women to divorce if male infertility can be proven, a woman’s initiation of a divorce continues to be so stigmatizing in Egypt that women rarely choose this option unless their marriages are truly unbearable (Inhorn, 1996). Although most husbands of infertile Egyptian women do *not* divorce their wives, thereby resisting tremendous family pressure, divorces over childlessness do occur, including, sadly, that of one of my infertile research assistants married to her husband for many years. Even among the presumably “enlightened” upper classes, some men would rather divorce their infertile wives than undergo the trials, tribulations, and expenses surrounding IVF. Furthermore, during the IVF treatment process, marriages sometimes come unglued under the intense physical and psychological pressure that this therapy typically exacts on couples.

But perhaps the saddest new twist in marital politics in Egypt has occurred as a result of the recent introduction of intracytoplasmic sperm injection (ICSI), the “newest” of the new reproductive technologies. Since its introduction in the early 1990s, ICSI has heralded a revolution in the treatment of male infertility (Fishel, Dowell, & Thornton, 2000; Hamberger & Janson, 1997). With ICSI, men with very poor semen profiles—even those without any mature sperm in the ejaculate—are now able to produce a “biological” child of their own. As long as a single viable spermatozoon can be retrieved from a man’s body, even through “harvesting” from the testes, this spermatozoon can be “injected” directly into an oocyte, thereby increasing the chances of fertilization (Fishel, Dowell, & Thornton, 2000). Not surprisingly, the arrival of ICSI in Egypt in the mid-1990s has led to the flooding of IVF clinics with male-infertility cases—for example, 70 percent of those couples I interviewed in 1996.

Unfortunately, many of the wives of these Egyptian men, who have “stood by” their infertile husbands for years, even decades in some cases, have grown too old to produce viable ova for the ICSI procedure. Because contemporary Islamic legal opinion in Egypt forbids any kind of ova donation or surrogacy, couples with a “reproductively elderly” wife face four difficult options: first, to remain together permanently without children; second, to legally foster an orphan, which, as noted earlier, is rarely viewed as an acceptable option among elites; third, to remain together in a polygynous marriage, which is rarely viewed as a tenable option by women themselves; or, finally, to divorce so that the husband can remarry a younger, potentially more fertile woman. Unfortunately, more and more highly educated, upper-class Egyptian men are choosing the final option of divorce—believing that their own reproductive destinies may lie with younger “replacement” wives, who are allowed to men under Islam’s personal status

laws. In short, the recent introduction of ICSI—coupled with contemporary personal status laws in Egypt—place infertile Egyptian women and the “old” wives of infertile Egyptian men in an extremely precarious position vis-à-vis their reproductive and marital futures.

Religion

Nevertheless, Egyptian IVF patients themselves do not question or challenge these Islamic legal opinions about who may and may not divorce and about who may and may not benefit from NRTs. The religious opinion on IVF/ICSI—which has been issued repeatedly from Egypt’s famed Al-Azhar University since 1980, which has been substantially upheld by the minority Coptic Christian patriarchate, and which strictly prohibits any form of third-party donation of sperm, eggs, embryos, or uteruses (as in surrogacy)—is considered by most Egyptian IVF and ICSI patients to be the “most important” element in the decision whether or not to use NRTs (Inhorn, 2003). As they explain, third-party donation of sperm, eggs, or embryos leads to a “mixture of relations.” Such mixing severs blood ties between parents and their offspring; confuses issues of paternity, descent, and inheritance; and leads to potentially incestuous marriages of the children of unknown egg or sperm donors. Thus, the thought of using donor eggs or sperm from a “bank” was simply reprehensible to both men and women in my study, and was tantamount in their minds to committing *zina*, or adultery. Surrogacy, in addition, was believed to tamper with the “natural maternal bond,” which is meant to be an exclusive link between one mother and her biological children.

Furthermore, much of this righteous discourse is now constructed in relation to discourses about the moral decline occurring in the Christian West. In Egypt, news stories and television movies imported from America and Europe show women who “rent their wombs,” only to struggle over custody of the children they bear; or infertility doctors who impregnate hundreds of women with their own sperm, only to be sent to prison; or IVF mothers, such as the one in the Netherlands, who bore black and white twins by two fathers because of a careless sperm admixture in an IVF laboratory. Proclaiming that this would never happen in Egypt—where women can trust that their IVF doctors are good, vigilant Muslims—women in Egyptian IVF centers described these stories, all of which happen to be true, with a kind of righteous incredulity. Furthermore, it is these kinds of media stories that prevent many (although not all) wealthy Egyptian couples from seeking NRT services abroad. Although some couples in my study had traveled to either the US or Europe to undertake IVF or ICSI, all of them were *extremely* concerned about following the Islamic restrictions on third-party donation, and hence, in several cases, they had sought

out Middle Eastern IVF physicians practicing in these foreign sites.

But such claims of moral superiority belie the fact that many Egyptians who are either contemplating or actually undertaking IVF or ICSI in local Egyptian IVF centers spend long hours worrying about “accidental donation”—namely, unintentional laboratory “mixups” of sperm, ova, or embryos. Although at least one Egyptian IVF center has implemented a form of video monitoring of all laboratory procedures (Inhorn, 2003), most have not. Thus, ongoing fears and suspicions of unintentional accidents occurring in Egyptian IVF labs may prevent many couples from undertaking IVF altogether; for once the products of conception leave one’s body, it is virtually impossible to know for sure whether these products will be returned untainted.

In summary, there may be a paradoxical “down side” to the religiously based moral code in place in Egypt, including the various anxieties it creates over the in vitro handling of biogenetic substances. On the one hand, Islamic textual sources clearly glorify motherhood and all it entails, insisting that women are endowed with a “natural maternal instinct” and that children are the “decorations of worldly life” (Schleifer, 1986). Yet, because of local Islamic restrictions on the uses of NRTs, which are strictly followed in medical settings in the country (Inhorn, 2003), infertile women who attempt to achieve glorious motherhood through resort to reproductive technologies are narrowly limited in their technological options. Moreover, these constraints seem even greater when one considers that Islamic doctrine also prohibits legal adoption for the same reasons it disallows IVF donation practices—namely, lack of biological connection and inheritance—thereby further restricting how families are to be formed and motherhood realized.

In summary, official Islamic opinions on the NRTs—first issued in Egypt and then widely adopted throughout the Sunni Islamic world (Blank, 1998; Meirou & Schenker, 1997; Serour, 1992, 1996)—have simultaneously encouraged and constrained the practice of IVF and other NRTs in Egypt. On the one hand, official Islamic opinion has recognized the importance of overcoming infertility through assisted conceptive techniques, as long as these techniques utilize biogenetic substances from a husband and a wife. However, if a reproductive problem requires the use of donor gametes—as is often the case—then the religious opinion is clear: No test-tube baby is better than an “illegal” one created through technologically immoral means.⁴

⁴Interestingly, in the Shi’a Muslim world of Iran, parts of Iraq, Lebanon, and the Arab Gulf, donor egg and sperm technologies are now accepted (as of the late 1990s), diverging considerably from the majority Sunni Muslim ban on third-party donation.

Thus, in Egypt, religion represents one of a series of constraints on infertile Egyptian couples' ability to successfully use NRTs. As shown in this article, other constraints include deeply entrenched belief systems, class divisions, and gender hierarchies, which, along with the physical risks, low success rates, and ongoing stigmatization of IVF, make it rather remarkable that "babies of the tubes" continue to be made in Egypt on a daily basis. In fact, despite the numerous constraints outlined in this article and in a forthcoming book on this subject (Inhorn, 2003), some of the best Egyptian IVF centers today—including the two in which I conducted this study in 1996—are remarkably successful in producing test-tube babies for elite Egyptian couples, as well as for the many wealthy Arab Gulf couples who travel to Egypt because of its test-tube baby making renown.

For those lucky Egyptian elites who are able to access and succeed with the NRTs, they are only too happy to be living in a Third World society in which the global has become the local, and the fruits of globalization are literally the test-tube children they bear. However, for the rest of Egypt's infertile population—and especially for the infertile poor, who are prevented by poverty and fundamental differences in belief from accessing NRTs—their reproductive futures remain uncertain, given the myriad obstacles that face them.

Conclusion

Despite the massive globalization of the NRTs, most infertile citizens of developing countries will never take home a test-tube baby, due to the kinds of structural and cultural constraints found in Egypt, as well as in other developing societies around the globe (Bharadwaj, 2001; Handwerker, 2001). On the one hand, this is fortunate, given that the NRTs are clearly *not* the "miracle solution" for overcoming infertility. As pointed out by numerous feminist scholars (Thompson, 2001), these technologies pose substantial risks to women's bodies (even in the pursuit of biological *paternity* among couples with an infertile male partner), as well as to women's status when motherhood is pursued at "all costs" in order to uphold traditional patriarchal family forms. On the other hand, the inability of most Third World couples to take home a test-tube baby *is* unfortunate, in that NRTs are, at least at this time, the only viable medical solution for the millions of cases of tubal and male infertility in the developing world.

Yet, given problems of expense and feasibility, few non-Western governments, including Egypt's, have been willing to commit state resources to the provision of NRTs, particularly given pressures to reduce fertility

and population growth rates. Thus, it can be anticipated that NRTs will never be a viable solution for the majority of infertile couples in the developing world, for whom lack of economic resources, as well as other powerful arenas of constraint, will constitute serious impediments to successful use of these technologies. In the end, then, NRTs will probably continue to circulate throughout the developing world, but they will spread to non-Western elites, who will "buy" these technologies from physicians in the private sector. The rest of the infertile population in developing societies will continue to suffer—not only from the social "dis-ease" that infertility engenders, but also from the lack of other viable solutions to this often intractable condition.

In some ways, the neglect of infertility and its treatment through NRTs seems justifiable in the developing world, given that many societies face other pressing health problems, including epidemic diseases such as AIDS, perceived overpopulation, shortages of health care resources, and deteriorating public health sectors (Bennett, McPake, & Mills, 1997; World Health Organization, 2000). Thus, ignoring infertility may seem to be a reasonable response, if it is argued that infertility is not a life-threatening "disease," nor is having children necessarily a basic human right. But for the millions of infertile citizens of developing countries, their childlessness is no trivial matter. Infertility may ruin their reputations, their marriages, their livelihoods, their physical health, and their long-term security in ways that are truly disastrous. Indeed, in non-Western places such as Egypt, infertility is a particularly pernicious form of "reproduction gone awry," one that engulfs whole lives in endless circles of treatment-seeking and human suffering.

So, what can be done? In my view as one who has studied infertility and the NRTs in Egypt for many years, the most salient and clear-cut need is for prevention of the many *preventable* causes of infertility—in Egypt as in other parts of the developing world. Primary prevention of infertility—particularly early and effective treatment of the reproductive tract infections that lead to tubal infertility (Sciarrà, 1997)—is clearly the key to avoiding most of the serious social sequelae of infertility, including the gendered suffering, adoption politics, relentless treatment-seeking, and very problematic resort to NRTs outlined in this paper. Nonetheless, because not all infertility *can* be prevented—and this is particularly true of male infertility—there will always be a desire for the latest, most modern reproductive technologies to overcome this problem, even in resource-poor locations of the developing world. As long as the global infertility problem continues unabated, the globalization of NRTs will continue well into the new millennium—reaching places like Egypt and beyond.

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