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Chapter 3
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Demography of Infertility

Epidemiological studies of infertility attempt to define variations in reproductive impairments for men and women of different ages, races, and parities (the number of children born to a woman), to illuminate historical trends, and to identify possible contributory factors. Three national demographic surveys—the 1965 National Fertility Study (NFS); the 1976 National Survey of Family Growth (NSFG), Cycle H; and the 1982 National Survey of Family Growth, Cycle III—provide data on infertility in the United States. All three surveys describe couples with married women in their childbearing years (defined as age 15 to 44) in the continental United States; the 1982 survey also contains information on never-married women of the same ages.

Cycle IV of the National Survey of Family Growth began in early 1988. The baseline survey is being repeated, and new questions have been added. Portions of this survey are directly related to infertility (see box 3-A). Preliminary data will be published in 1989, with more reports to follow in 1990 and subsequently (19). Cycle V of the NSFG is scheduled for 1992.

Other sources of data concerning the availability and use of infertility services, such as a series of surveys by the Alan Guttmacher Institute looking at private physicians and family planning organizations, are discussed in this chapter. In conjunction with the NSFG, these surveys yield a description of infertility service providers.

NSFG DATA

In 1982, the NSFG surveyed a sample of 7,969 women of reproductive age, of whom 3,551 were married. The data for each woman are multiplied by the number of women she represents in the population, so the 7,969 women interviewed represent the 54 million women aged 15 to 44 in the United States. Thus, the data in this chapter represent national estimates (21).

The questions were addressed only to women, so in married couples the wife spoke for herself and her husband. Data from the surveys thus measure infertility of the couple. They do not distinguish male and female factors related to infertility. This chapter refers to the “couple” instead of the “wife” when presenting the data. Similar data for men do not exist, as the Government collects little information on the reproductive health of men.

Definitions

A couple’s reproductive ability is categorized in three ways by demographers: surgically sterile (impossible to have a baby, whether by choice or not); impaired fecundity (nonsurgically sterile

or difficult or dangerous to have a baby); and fecund (no known physical problem). Many couples classified as fecund actually have unknown fecundity—those using contraception, for example.

Fecundity refers to the potential of a couple to reproduce. The medical profession prefers the term fertility, which refers to actual conception rates. Infertility is a medical term indicating 12 months of unprotected intercourse without conception (see ch. 2). Thus, infertility does not indicate sterility but instead highlights a population that has trouble conceiving and may need medical assistance.

For this report, the term infertility rather than impaired fecundity is used. The percentage of infertile couples is slightly less than the percentage with impaired fecundity, as the latter category includes couples for whom it is difficult or dangerous for the woman to maintain a pregnancy (a category that includes miscarriage). Infertility refers only to couples who have tried to conceive and failed, not to couples who choose not to attempt conception (whether for medical or social reasons).

Box 3-A. National Survey of Family Growth, 1988

Cycle IV of the National Survey of Family Growth, conducted by the National Center for Health Statistics between January 1988 and July 1988, asks approximately 10,600 women about their sex education, pregnancy history, ability to bear children and future plans, use of family planning and infertility services, and socioeconomic data.

The chief questions regarding infertility asked by the 1988 NSFG include the following (questions from previous surveys are similar):

- Some women find it physically impossible to have (more) children. As far as you know, is it physically possible or impossible for you, yourself to conceive a(nother) baby, that is, to get pregnant (again)?
- What about your (husband/partner)? Is it physically possible or impossible for him to father a(nother) child?
- What is the reason that it is physically impossible for you (and your husband/partner) to have a(nother) baby?
- Some people are able to have a(nother) baby, but have difficulty getting pregnant or holding onto the baby. As far as you know, is there any problem or difficulty for you (and your husband/partner) to conceive or deliver a(nother) baby (after this pregnancy)?
- What is the reason it would be difficult for you to have a(nother) baby?
- Have you (or your husband/partner) ever been to a doctor or clinic to talk about ways to help you become pregnant?
- What kinds of medical treatment or advice have you (or your husband/partner) had to help you (become pregnant/prevent miscarriage)?
- To which of the places [listed] did you (or your husband/partner) go for that visit?
- After you (or your husband/partner) went for this treatment or advice, were you able to have a baby?
- Have you (or your husband/partner) had an operation, or more than one operation, that would prevent you from conceiving a(nother) baby (together)?
- What kind of operation, or operations, did you (or your husband/partner) have that would prevent you from conceiving a(nother) baby?
- Before the (first) operation was it impossible for you (and your husband/partner) to conceive a(nother) baby, was it difficult, or did you have no problem at all?
- Have you (or your husband/partner) ever had surgery or treatment to reverse a sterilization operation?
- Have you ever been treated in a doctor's office, clinic, or emergency room for an infection in your fallopian tubes, womb, or ovaries, also called a pelvic infection, pelvic inflammatory disease, or PID?
- How many times have you been treated for PID?
- Have you ever heard of chlamydia?
- Has a doctor ever told you that you have chlamydia?
- Has a doctor ever told you that you have gonorrhea?
- Has a doctor ever told you that you have endometriosis?

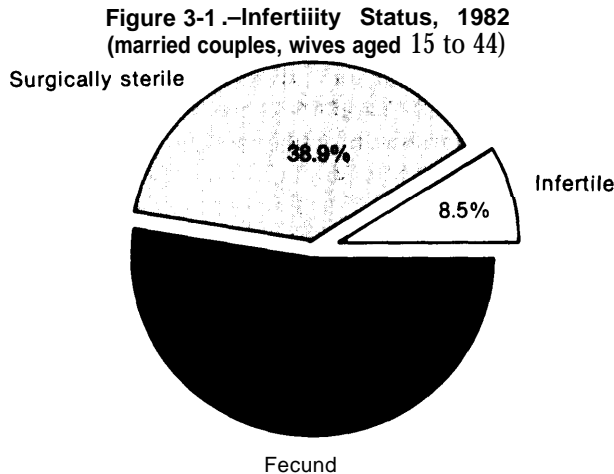
SOURCE U.S. Department of Health and Human Services Public Health Service National Center for Health Statistics, *National Survey of Family Growth Cycle IV* (Washington, DC:1988)

Survey Results

In 1982, 8.5 percent (2.4 million) of married couples were infertile, 38.9 percent (11.0 million) were surgically sterile, and 52.6 percent (14.8 million) were fecund (see figure 3-1). **The number of infertile couples declined from 3.0 million in 1965 to 2.4 million in 1982. More importantly, primary infertility (childlessness) doubled, from 500,000 in 1965 to 1 million in 1982,**

while secondary infertility (in which couples have at least one biological child) declined, from 2.5 million in 1965 to 1.4 million in 1982 (see table 3-1) (18).

The increase in primary infertility can be explained partly by the fact that more couples are attempting to have children, as members of the baby-boom generation reach their childbearing



SOURCE: Office of Technology Assessment, 1968.

years and try to have their first baby. The decrease in secondary infertility can be explained by the increase in voluntary surgical sterilization (from 15.8 percent in 1965 to 38.9 percent in 1982). This increase was due solely to the increase in sterilization for contraceptive purposes; the change in noncontraceptive sterilization was slight (18,22). Contraceptive sterilization masks a number of women who might otherwise discover that they were infertile, especially at ages 30 and older (22).

Although the percentage of couples infertile appears to have decreased over the past two decades (from 11.2 percent in 1965 to 8.5 percent in 1982), this drop is entirely due to the rise in surgical sterilization. **Excluding the surgically**

sterile, the percentage of couples infertile has changed only slightly, rising from 13.3 to 13.9 percent (18).

Black couples are more likely than white couples to be infertile; in 1982, the risk of infertility for black couples was 1.5 times that for white couples (26). Many possible explanations for these higher rates have been presented, although no data exist on the subject:

- the higher incidence of sexually transmitted diseases (STDs), as STDs account for an estimated 30 percent of infertility in some high-risk populations in the United States (26) and may account for up to 20 percent of infertility overall (4) (the difference in rates of STD between blacks and whites reflects the difference in other relevant demographic characteristics, such as urban dwelling, rather than actual racial differences (7));
- the greater use of intrauterine devices (which can increase the likelihood of pelvic inflammatory disease);
- environmental factors, such as occupational hazards affecting reproduction (30); and
- complications or infections following childbirth or abortion (25).

Couples with wives having less than a high school education were also more likely to be infertile (2,16).

Within age groups, the only significant change over time occurred in those 20 to 24

Table 3.1. infertile Couples, 1965 and 1982

Couples	All		Excluding surgically sterile	
	1965	1982	1965	1982
Number of couples (millions) ^a				
Total	26.5	28.2	22.3	17.2
Childless	3.5	5.1	3.2	4.6
1 or more children	23.0	23.1	19.1	12.6
Number infertile (millions)				
Total	3.0	2.4	3.0	2.4
Childless	0.5	1.0	0.5	1.0
1 or more children	2.5	1.4	2.5	1.4
Percent infertile				
Total	11.2	8.5	13.3	13.9
Childless	14.5	19.6	15.6	21.8
1 or more children	10.9	6.1	13.1	11.1

^aWives 15 to 44 years old.

SOURCE: Adapted from W.D.Mosher, "infertility: Why Business Is Booming," *American Demographics* 9:42-43, 1987.

years old. In 1965, 4 percent of this group were infertile; by 1982, 11 percent were infertile (17,26). This increase may be linked to the tripled gonorrhea rate of this age group between 1960 and 1977 (18), as well as to the factors mentioned previously regarding the higher rates of infertility in black couples. This particular group is important, as one in three births in the United States occurs to women 20 to 24 (22).

Data from the NSFG indicate that infertility increases with age: Excluding the surgically sterile, 14 percent of married couples with wives aged 30 to 34 are infertile, while 25 percent of couples with wives aged 35 to 39 are infertile (see table 3-2) (18). To date, the influence of age on female fertility has been examined more closely than has its influence on male fertility. Although viable sperm production does decline with age in humans (13), the effect of this on fertility has not been determined (23).

In recent years there has been controversy in the scientific and popular literature over the rate at which a woman's fertility decreases with age (3,8,9,14,15,27). Studies have attempted to control for variables such as frequency of intercourse (which is known to decrease as the length of marriage increases) and to examine societies that have little evidence of deliberate fertility control. The results are varied and widely debated, but all seem to indicate that female fertility does decrease somewhat before age 35 and significantly more after age 35. The disagreement focuses primarily on the extent of the decrease when a woman reaches age 30. Most of the available statistics are more useful for indicating the number and types of women who are likely to need and use infertility services than for estimating a woman's decreased fertility with age and the effects of delayed childbearing (15).

Survey Limitations

Available survey data may misrepresent the true numbers of infertile couples. First, the boundary of 1 year for the definition of infertility is somewhat arbitrary; many couples classified as infertile after 1 year will conceive later without medical assistance (15). In an unrandomized observational study of 1,145 infertile couples, 41 percent of those whose infertility problems were treated later con-

ceived, while 35 percent of those untreated also became pregnant (3). However, the 1-year limit has both a practical and a theoretical justification. Practically, the NFS and NSFG are the only national surveys to examine infertility status, and they use the 1-year definition. Most physicians use this definition as well (20). Furthermore, if an average woman with no infertility problems has an approximate monthly probability of conception of 20 percent (0.2 as a proportion), 93 percent of all women would theoretically conceive after 1 year of unprotected intercourse (12).

Second, the surveys did not directly ask whether the respondent had ever tried to become pregnant (22), meaning that women who have always used contraception, never had intercourse, or never tried to become pregnant were assumed to be fertile. A number of potentially infertile couples may be hidden in the groups of surgically sterilized couples and couples using contraception. The authors corrected for one problem by excluding the surgically sterile from some data and thus removing the effects of the sharp rise in surgical sterilization between 1965 and 1982. However, couples using contraception who have not been proved fertile are included in the category "fecund," which may lead to an underestimation of the extent of infertility.

Third, the surveys refer to married couples with wives aged 15 to 44. As a result, unmarried men and women are not included in these figures (except in the 1982 data, when unmarried women were also surveyed). Excluding unmarried couples may have resulted in an underestimate of the absolute number of infertile couples. Finally, the data only permit a guess at the populations at increased risk for infertility.

Table 3-2. Infertility and Age, 1965 and 1982 (percent)^a

Age of wife	1965	1982
15 to 19	0.6	2.1
20 to 24	3.6	10.6
25 to 29	7.2	8.7
30 to 34	14.0	13.6
35 to 39	18.4	24.6
40 to 44	27.7	27.2
Total, 15 to 44	13.3	13.9

^aPercent of married couples excluding those surgically sterilized. Data are based on samples. The only statistically significant change between 1965 and 1982 is the increase at age 20 to 24.

SOURCE: W.D. Mosher, "Infertility: Why Business Is Booming," *American Demographics* 9:42-43, 1987.

INFERTILITY SERVICES

The National Survey of Family Growth provides data on the infertility services most frequently received by the population. Overall, the 1982 survey reports the following services as most popular among female respondents: advice on the timing of intercourse (19 percent); general health advice (18 percent); drugs to induce ovulation (17 percent); other advice (15 percent); and tests (12 percent). The most frequently reported infertility service for husbands was a sperm count (29).

Who Provides Infertility Services?

Providers of medical infertility treatment services typically fall into three categories:

- primary care physicians,
- specialized infertility centers that offer in vitro fertilization (IVF), and
- other centers offering infertility treatment.

In general, primary care physicians appear to be the front-line providers of infertility treatment services. According to one survey, patients seeking such services from primary care physicians are served mainly by obstetrician/gynecologists (66 percent), followed by urologists (22 percent) (1). Most patients first discuss their concerns with either an obstetrician/gynecologist (for a female) or a urologist (for a male) or both.

Infertility care is also provided by other physicians. The Alan Guttmacher Institute (AGI) surveyed a sample of the 100,000 private physicians in four specialties, and estimated that some 45 percent of them provide infertility care (1). These 45,600 physicians include 17,500 general/family practitioners, 1,400 surgeons, 20,600 obstetrician/gynecologists, and 6,100 urologists (1). The large proportion of general and family practitioners is explained by the large number of them in practice (about twice as many as obstetrician/gynecologists) as well as by their widespread geographical distribution (24).

Most obstetrician/gynecologists (96 percent) and urologists (92 percent) provide at least some infertility services as part of their private office practice, although this may not be their area of specialization or greatest expertise. General/family practitioners (35 percent) and general surgeons

(6 percent) were less likely to offer any infertility services. Physicians practicing in the north central and western regions of the country, as well as younger physicians, are slightly more likely than other physicians to treat infertility (1).

Although virtually no private physicians provide all infertility treatment services, the vast majority of obstetrician/gynecologists provide basic diagnostic services, as well as a substantial number of diagnostic/treatment services, including clomiphene (91 percent), hysterosalpingograms (89 percent), and laparoscopies (85 percent). Similarly, 83 percent of urologists provide basic physical exams and counseling, as well as semen analyses (1). Artificial insemination is also frequently arranged with private physicians (28).

Most physicians who provide infertility services refer patients elsewhere when necessary, usually to another physician (1). However, for female patients, obstetrician/gynecologists are more likely than general practitioners to make referrals to infertility centers or clinics rather than to other physicians. This may be due to the relatively complex services that such physicians already provide for women, and the need for specialty referrals.

Estimates of the number of patients treated privately for infertility vary widely. Data from the 1980-81 National Ambulatory Medical Care Survey show that the number of office visits, by the principal diagnosis of infertility, to physicians practicing obstetrics and gynecology averaged 556,000 annually (6). One analysis of this data estimated that between 111,200 and 161,240 new infertility cases are diagnosed each year and that between 200,000 and 300,000 patients are treated for infertility annually (6).

The AGI study estimates that private physicians in the United States see 1.55 million patients annually for infertility; this may include patients who see more than one physician, as well as both partners in a couple. The National Survey of Family Growth estimated that 1 million to 1.2 million couples consulted a physician about infertility problems in 1981; about 80 percent of the consults (i.e., 800,000 to 950,000) were sought from private physicians (1).

The second category of infertility service providers, IVF/infertility centers, is discussed in detail in chapter 8. In 1987, there were 169 clinics in the United States offering IVF or gamete intrafallopian transfer (see app. A), but proficiency in these techniques varied widely. Most centers offer a variety of the well-established infertility diagnostic and treatment services, except male microsurgery and artificial insemination. Many clinics are more oriented toward the treatment of female infertility than male infertility.

The last category of providers includes family planning agencies in hospitals, health departments, and Planned Parenthood facilities. Under the guidelines to Title X of the Public Health Service Act, family planning service grantees must make basic infertility services available to clients upon request. The AGI survey estimated that 70 percent of family planning agencies, or 1,712 agencies nationwide (compared with 45,000 private physicians), provide at least some basic infertility services (e.g., physical exams, counseling, infection investigation, and basal body temperature instruction) (1). However, at least half the family planning agencies responding to this question said that they see fewer than 10 infertility patients per year; lack of demand, lack of appropriately trained staff and lab facilities, and the high costs of infertility services are among the reasons that this type of agency accounts for a minimal amount of infertility services.

The category of "other" infertility service providers also includes an unknown (although probably small) number of centers that specialize in infertility services but that do not provide IVF or gamete intrafallopian transfer.

Who Seeks Infertility Services?

In 1982, couples with primary infertility were twice as likely as couples with secondary infertility to seek infertility services; approximately half of the women with primary infertility stated that they or their husbands had ever sought services, compared with approximately one quarter of the women with secondary infertility (see table 3-3) (10). Overall, 31.4 percent of infertile married couples had ever looked for infertility services. Cou-

Table 3-3. Use of Services for Infertility, 1982 (percent)

Infertility status	Women who ever sought services ^a
All infertile women	31.4
Women with primary infertility	51.2
Women with secondary infertility.	22.4

^aWives 15 to 44 years old.

SOURCE: Adapted from M.B. Hirsch and W.D. Mosher, "Characteristics of Infertile Women in the United States and Their Use of Infertility Services," *Fertility and Sterility* 47:61 S-625, 1987.

pies with older wives were more likely to have used such services (11).

Although black couples are more likely to be infertile, a larger proportion of white couples had requested medical evaluation of their infertility in the 3 years before the NSFG (11). In 1982, 18.6 percent of ever-married white women had used services for infertility, compared with 13.5 percent of ever-married black women (11). (The category "ever-married women" is larger than the category "currently married women," used previously in this report. However, the number of divorced or separated women seeking infertility services is likely to be relatively small.)

Based on the 1982 NSFG, it is estimated that 1 million evermarried women in the United States stated in 1982 that they or their husbands had used infertility services in the past year (11). In the same year, approximately 6 million (or one in six) ever-married women 15 to 44 years old stated that they or their husbands had used such services at some point during their lives.

The NSFG estimates of the number of infertile couples probably underestimate the number of couples who might seek treatment for infertility. The category "surgically sterile" hides a number of couples who would have discovered infertility problems had they not been sterilized. It also includes a number of individuals who may have changed their minds about undergoing contraceptive sterilization. If the couple desires a future birth, they may seek infertility services to overcome their self-imposed sterility. Second, couples who are unable to have a live birth or who choose not to conceive because it is difficult or dangerous for the woman to carry a pregnancy to term are not included in the definition of infertility;

however, they might be candidates for some type of infertility service (e.g., surrogate motherhood).

Increased Use of Services

Although the percentage of American couples faced with infertility does not appear to have grown, popular concern about infertility has increased, as has the demand for infertility services.

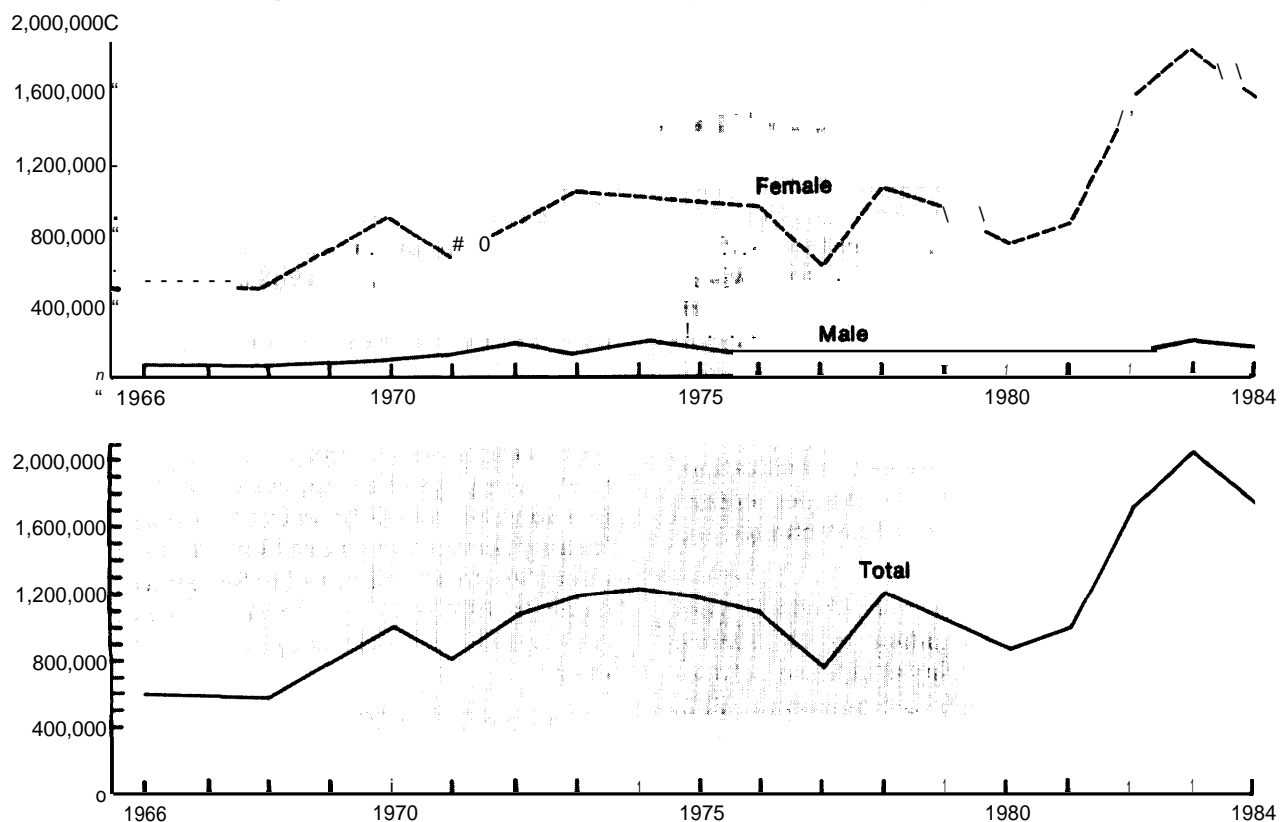
The greater demand for infertility services is well documented. The estimated number of visits to private physicians' offices for consultation related to infertility rose from about 600,000 in 1968 to over 900,000 in 1972 to about 2 million in 1983, then dropped to 1.6 million in 1984 (see figure 3-2).

Although the 20 to 24 year olds, for whom infertility actually did increase, are an important group, the growth of infertility among them is not significant enough to account for the increased

demand for infertility services. A number of factors have contributed to an increase in demand despite the absence of an overall increase in infertility rates (see table 3-4):

- The absolute number of couples with primary infertility has risen with the aging of the baby-boom generation; with delayed childbearing, which exposes more couples to higher age-specific infertility rates; with the use of oral contraceptives (which often delay conception, thus inflating numbers of infertile couples); and with the tendency of couples to classify themselves as infertile more quickly (due to a desire to condense childbearing into a shorter interval, for example).
- The proportion of couples seeking treatment has risen due to the decreased number of infants available for adoption; the increased awareness of various treatments available for

Figure 3-2.—Total Visits to Private Physicians for Infertility, 1966-84



SOURCE: W. Cates, Jr., Director, Division of Sexually Transmitted Diseases, Center for Prevention Services, Centers for Disease Control, Atlanta, GA, personal communication, June 23, 1987

Table 3-4.-Some Causes of Increasing Requests for Infertility Services in the 1980s

More couples with primary infertility	Increasing proportion of infertile couples seeking care	Increasing number of physicians providing infertility services	More conducive social milieu	Evolution of new reproductive technologies
<ul style="list-style-type: none"> • Aging of the baby-boom generation • Delayed childbearing; more people in higher risk age groups • Childbearing condensed into shorter intervals • Delayed conception due to prior use of oral contraceptives 	<ul style="list-style-type: none"> • Decreased supply of infants available for adoption • Heightened expectations • Larger number of people in higher income brackets with infertility problems • Larger percent of infertile couples are primarily infertile 	<ul style="list-style-type: none"> • Greater demand from private patients • More sophisticated diagnosis and treatment • At least 169 sites in the United States offering IVF or GIFT 	<ul style="list-style-type: none"> • Baby-boom generation expects to control their own fertility • Profamily movement • Increased discussion of sexual matters due to the AIDS epidemic • Extensive media coverage 	<ul style="list-style-type: none"> • IVF • GIFT • Artificial insemination • Surrogate motherhood • Cryopreservation

SOURCE: Adapted from S.O. Aral and W. Cates, Jr., "The Increasing Concern With Infertility: Why Now?" *Journal of the American Medical Association* 250:2327-2331, 1983.

infertility; a greater proportion of couples in higher socioeconomic brackets with infertility problems; and a larger number of couples with primary infertility.

- Increasing numbers of physicians are providing infertility services.
- The profamily movement has defined infertility as a major health problem. Sexual matters are generally discussed more openly as

a result of the AIDS epidemic.

- Novel reproductive techniques used to treat infertility have evolved.

Overall, the increase in requested infertility services has likely surpassed any actual increase in the overall percentage of couples with infertility.

SUMMARY AND CONCLUSIONS

In 1982, approximately 8.5 percent of all married couples were infertile, 38.9 percent were surgically sterile, and 52.6 percent were fecund. Generally, black couples, couples with older wives, and couples with the wife having less than a high school education were at higher risk for infertility. The percentage of married couples who were infertile decreased significantly between 1965 and 1982, although this decrease can largely be explained by the increase in surgical sterilization. Excluding the surgically sterile, the percentage of married couples infertile did not change significantly.

The number of infertile couples declined from 3.0 million in 1965 to 2.4 million in 1982. More importantly, primary infertility (childlessness) doubled, from 500,000 in 1965 to 1 million in 1982, while secondary infertility (in which couples have at least one biological child) declined, from 2.5 million in 1965 to 1.4 million in 1982.

Female fertility decreases somewhat before age 35 and significantly more after age 35. There is

considerable controversy over the extent of the decrease, especially between ages 30 and 35. Another cycle of the National Survey of Family Growth began in early 1988 and will collect further information on all these trends; preliminary data will be published in late 1989.

Infertility treatment is provided by primary care physicians, specialized infertility centers, and other centers (e.g., family planning clinics). Primary care physicians appear to be the front-line providers of infertility services. Couples using infertility services are more likely to have primary infertility, to be white, and to have wives who are older. In 1982 only 31.4 percent of infertile married couples had ever sought services for infertility.

The demand for infertility services has increased rapidly in recent years, despite the fact that the actual incidence of infertility has not. The number of office visits to private physicians for infertility services rose from about 600,000 in 1968 to some 1.6 million in 1984.

CHAPTER 3 REFERENCES

1. Alan Guttmacher Institute, ***Infertility Services in the United States: Need, Accessibility and Utilization*** (New York, NY: 1985).
2. Aral, S.O., and Cates, W., "The Increasing Concern With Infertility: Why Now?" *Journal of the American Medical Association* 250:2327-2331, 1983.
3. Bongaarts, J., "Infertility After Age 30: A False Alarm," *New England Journal of Medicine* 14:75-78, 1982.
4. Cates, W., Jr., Director, Division of Sexually Transmitted Diseases, Centers for Disease Control, Atlanta, GA, personal communication, Apr. 28, 1987.
5. Collins, J. A., Wrixon, W., Janes, L. B., et al., "Treatment-Independent Pregnancy Among Infertile Couples," *New England Journal of Medicine* 309:1201-1206, 1983.
6. Cooper, G., "The Magnitude and Consequences of Infertility in the United States," prepared for Resolve, Inc., Feb. 1, 1985.
7. Cooper, G. S., Research Associate, Uniformed Services University of the Health Sciences, Bethesda, MD, personal communication, Aug. 28, 1987.
8. DeCherney, A. H., and Berkowitz, G. S., "Female Fecundity and Age," *New England Journal of Medicine* 306:424-425, 1982.
9. Hendershot, G. E., Mosher, W. D., and Pratt, W. F., "Infertility and Age: An Unresolved Issue," *Family Planning Perspectives* 14:287-289, 1982.
10. Hirsch, M. B., and Mosher, W. D., "Characteristics of Infertile Women in the United States and Their Use of Infertility Services," *Fertility and Sterility* 47:618-625, 1987.
11. Horn, M. C., and Mosher, W. D., "Use of Services for Family Planning and Infertility: United States, 1982," *nchs: advancedata* 103:1-8, 1984.
12. Jansen, R., "The Clinical Impact of In Vitro Fertilization: I. Results and Limitations of Conventional Reproductive Medicine," based on the 1985 Sheddon Adam Memorial Lecture, delivered at the Royal Brisbane Hospital, June 1985.
13. Johnson, L., Petty, C. S., and Neaves, W.B. "Influence of Age on Sperm Production and Testicular Weights in Men," *Journal of Reproductive Fertility* 70:211-218, 1984.
14. Menken, J., "Age and Fertility: How Late Can You Wait?" *Demography* 22:469-483, 1985.
15. Menken, J., Trussell, J., and Larsen, U., "Age and Infertility," *Science* 233:1389-1394, 1986.
16. Mosher, W.D., "Infertility Trends Among U.S. Couples, 1965-1976," *Family Planning Perspectives* 14:22-30, 1982.
17. Mosher, W. D., "Infertility in the United States, 1965-1982," paper presented at the 3rd International Congress of Andrology Post Graduate Course, Boston, MA, Apr. 28, 1985.
18. Mosher, W. D., "Infertility: Why Business Is Booming," *American Demographics* 9:42-43, 1987.
19. Mosher, W. D., Statistician, Family Growth Survey Branch, Division of Vital Statistics, National Center for Health Statistics, Hyattsville, MD, personal communication, July 9, 1987.
20. Mosher, W. D., Statistician, Family Growth Survey Branch, Division of Vital Statistics, National Center for Health Statistics, Hyattsville, MD, personal communication, Aug. 18, 1987.
21. Mosher, W. D., "Fecundity and Infertility in the United States," *American Journal of Public Health* 78:181-182, 1988.
22. Mosher, W.D., and Pratt, W. F., "Fecundity and Infertility in the United States, 1965-82," *nchs: advancedata* 104:1-8, 1985.
23. Nieschlag, E., Lammers, U., Freischem, C. W., et al., "Reproductive Functions in Young Fathers and Grand fathers," *Journal of Clinical Endocrinology and Metabolism* 55:676-681, 1982.
24. Orr, M.T., and Forrest, J. D., "The Availability of Reproductive Health Services From U.S. Private Physicians," *Family Planning Perspectives* 17:63-69, 1985.
25. Pratt, W. F., Mosher, W. D., Bachrach, C. A., et al., "Understanding U.S. Fertility: Findings From the National Survey of Family Growth, Cycle II," *Population Bulletin* 39:5, 1984.
26. Pratt, W. F., Mosher, W. D., Bachrach, C. A., et al., "Infertility-United States, 1982," *Morbidity and Mortality Weekly Report* 34:197-199, 1985.
27. Schwartz, D., and Mayaux, M.J. (Federation CECOS), "Female Fecundity as a Function of Age: Results of Artificial Insemination in 2193 Nulliparous Women With Azoospermic Husbands," *New England Journal of Medicine* 306:404-406, 1982.
28. Thomason, J., Blue Cross/Blue Shield, State of Maryland, personal communication, November 1986.
29. Thorne, E., and Langner, G., "Expenditures on Infertility Treatment," prepared for the Office of Technology Assessment, U.S. Congress, Washington, DC, January 1987.
30. U.S. Congress, Office of Technology Assessment, ***Reproductive Health Hazards in the Workplace***, OTA-BA-266 (Washington, DC: U.S. Government Printing Office, 1985).