Published in final edited form as:
Fertil Steril. 2011 March 1; 95(3): 915–921. doi:10.1016/j.fertnstert.2010.11.026.

Costs of infertility treatment: Results from an 18-month prospective cohort study

Patricia Katz, PhD[1], **Jonathan Showstack, PhD, MPH**[1], **James F. Smith, MD, MS**[2,3], **Robert D. Nachtigall, MD**[3], **Susan G. Millstein, PhD**[4], **Holly Wing, MA**[1], **Michael L. Eisenberg, MD**[2], **Lauri A. Pasch, PhD**[5], **Mary S. Croughan, PhD**[3,6], and **Nancy Adler, PhD**[5]

[1]Department of Medicine, University of California, San Francisco, San Francisco, CA

[2]Department of Urology, University of California, San Francisco, San Francisco, CA

[3]Department of Obstetrics, Gynecology, and Reproductive Sciences, University of California, San Francisco, San Francisco, CA

[4]Department of Pediatrics, University of California, San Francisco, San Francisco, CA

[5]Department of Psychiatry, University of California, San Francisco, San Francisco, CA

[6]Department of Epidemiology and Biostatistics, University of California, San Francisco, San Francisco, CA

Abstract

Objectives—To examine resource use (costs) by women presenting for infertility evaluation and treatment over 18 months, regardless of treatment pursued.

Design—Prospective cohort study in which women were followed for 18 months.

Setting—Eight infertility practices.

Patients—398 women recruited from infertility practices.

Data collection—Women completed interviews and questionnaires at baseline, and after 4, 10, and 18 months of follow-up. Medical records were abstracted after 18 months to obtain details of services used.

Main outcome measures—Per-person and per-successful-outcome costs

Results—Treatment groups were defined as highest intensity treatment use. 20% of women did not pursue cycle-based treatment; about half pursued in-vitro fertilization (IVF). Median per-person costs ranged from $1,182 for medications only, to $24,373 and $38,015 for IVF and IVF-donor egg groups, respectively. Estimates of costs of successful outcomes (delivery or ongoing pregnancy by 18 months) were higher – $61,377 for IVF, for example – reflecting treatment success rates. Within the timeframe of the study, costs were not significantly different for women who were successful and women who were not.

Corresponding author: Patricia P. Katz, PhD, University of California, San Francisco, 3333 California Street, Suite 270, San Francisco, CA 94143-0920, Phone: 415-476-5971, Fax: 415-476-9030, patti.katz@ucsf.edu.

Conclusions—While individual patient costs vary, these cost estimates developed from actual patient treatment experiences may provide patients with realistic estimates to consider when initiating infertility treatment.

Keywords

infertility; cost; resource use; prospective study

Introduction

Although approximately 12% of American women will receive infertility services during their lifetime, only 1–2% will undergo treatment with assisted reproductive technologies (ART), primarily in vitro fertilization (IVF)(1). In 2006, the latest year for which data are available, 138,198 ART cycles were initiated, more than 99% of which were IVF cycles(2). There is no comparable information on the number of cycles of lower intensity infertility treatments such as intrauterine insemination (IUI).

Several studies have examined both the per-cycle and per-live-birth costs of IVF. In 2001, median US costs per IVF cycle and per IVF birth were estimated to be $9,226 and $56,419, respectively(3). More recently, per-cycle and per-live-birth estimates of $12,513 and $41,132 have been proposed (2006 dollars)(4). Unlike many expensive medical treatments that are covered by health insurance, infertility treatment is usually paid for out of pocket, including an estimated 85% of IVF costs(5). Although IVF is the most expensive infertility treatment on a per-cycle basis, even lower intensity treatments such as intrauterine insemination (IUI) may generate significant costs, yet these procedures are rarely considered in estimates of infertility treatment costs.

While costs per cycle are important, knowing the potential full cost of treatment allows for more informed policy-making and better individual choice. The aims of this study were to examine the medical service use (i.e., resource use) by couples presenting for infertility evaluation prospectively over an 18-month period, regardless of whether they pursued IVF or lower-intensity treatments, and to translate resource use into cost estimates. To our knowledge, this is the first cost estimation study to include the full range of infertility treatment and to focus on the prospective per-person, rather than per-cycle, costs.

Materials and Methods

Subjects and data collection

Women were recruited from 8 reproductive endocrinology practices. All clinics offered all treatment options studied. Eligibility criteria included: first visit to the recruitment clinic for infertility; no previous IVF, hysterectomy, or sterilization; not seeking treatment for recurrent miscarriage; trying to become pregnant with a male partner; English-speaking; and baseline interview conducted within 6 weeks following the initial clinical visit and before any new treatment was initiated.

Information describing the cohort has been previously published(6–10). Briefly, participants completed baseline in-person interviews and questionnaires. Follow-up questionnaires and telephone interviews were conducted 4, 10, and 18 months later. After the 18-month study period, medical records were collected from recruitment physician practices and any other physicians seen for infertility-related care during the study period.

Of eligible women, 372 (35.8%) refused, we were unable to contact 194 (18.7%), and 58 (5.6%) underwent fertility treatment before we could conduct their baseline interview. 416

women participated in baseline interviews (40.0% of eligible). Medical records from recruitment practices were not obtained for 18, leaving 398 for analysis.

Cost estimation

Our goal was to develop standardized cost estimates that did not reflect differences across clinics in the cost of providing particular services (i.e., represented the theoretical costs of treatment if all patients had received treatment under the same cost structure), but did reflect the mix of services that patients received. Per-person infertility treatment resource use was gathered primarily from medical records, augmented by information from interviews. CPT codes (codes used to report medical services for insurance purposes) were matched to each service(11).

Standardized resource use values (which will be referred to as “costs”) were attached to each service and medication to eliminate variation over time and across practices(12). Relative value units (RVUs) for each service, matched by CPT code, were obtained from the 2006 National Physician Fee Schedule relative value file(13). For laboratory tests, values from the 2006 Centers for Medicare and Medicaid Services (CMS) clinical laboratory fee schedule were used as cost estimates. Medication costs were based on average wholesale prices from the 2006 Red Book(14), except for gonadotropins. Practices generally referred patients to on-line sources for gonadotropins, so costs for these medications were based on the 2006 prices charged by these on-line vendors.

Multiple births generate higher costs than singleton births(15, 16), yet few studies have included maternal and neonatal costs in estimates of infertility treatment costs. We used data reporting daily neonatal and maternal hospital costs by birth weight in 250-gram increments (17), inflating costs to 2006 dollars(18), to estimate such costs. Neonatal costs were estimated by multiplying the average cost per day, based on birth weight(17), by the number of hospitalized days. In the case of multiple births, neonatal costs were calculated separately for each infant. Maternal costs were estimated by multiplying the maternal length of stay by the average maternal daily cost, again stratified by infant birth weight. We obtained birth weights, gestational ages, and maternal and neonatal hospital lengths of stay from telephone interviews with the mothers.

Treatment groups

We categorized individuals into groups based on the highest treatment intensity received during the study period:

1. No cycle-based treatment (NOCYCLE; Could include tests or surgical procedures).
2. Medications only (MEDS).
3. IUI with clomiphene (IUI-C).
4. IUI with gonadotropins (IUI-FSH).
5. IVF.
6. IVF with donor egg (IVF-DE).

Additional data

Diagnoses were obtained from medical records. Female infertility diagnoses were categorized as tubal, uterine, ovarian, ovulatory, or unexplained(2) and were not mutually exclusive. All male factor diagnoses were grouped together. Sociodemographic characteristics were assessed in the baseline questionnaire. Pregnancy and delivery

information was obtained from follow-up telephone interviews. Information on treatments received prior to the study was obtained from baseline questionnaires.

Analysis

Records from non-recruitment practices were incomplete for 105 women (26%), so the cost of additional treatment cycles was estimated based on the type of treatment (e.g., IUI-C) reported in the follow-up interviews and the median cost of all cycles of that type (MEDS $636, IUI-C $1453, IUI-FSH $3841, IVF $14,402, IVF-DE $21,771). Of the 1106 cycles that occurred during the study period, 192 (17%) of them were added based on interview data.

Treatment use and costs were estimated separately for women who experienced “successful outcomes” and for those who did not, and compared with t-tests. Successful outcomes were either a treatment-related delivery before the end of follow-up or an ongoing treatment-related pregnancy at the end of follow-up.

To provide a proxy of treatment costs from a societal perspective, per-successful-outcome costs within each treatment group were calculated. All treatment costs from all subjects within the group comprised the numerator, and number of successful outcomes the denominator. For women who did not pursue cycle-based treatment, a similar analysis was performed, using all deliveries and ongoing pregnancies as the denominator.

Delivery cost estimates were highly skewed because of a few very long hospitalizations of infants from multiple births. We therefore calculated two estimates for delivery costs: one using median cost estimates for singleton and multiple births, representing a relatively conservative (e.g., low) estimate of costs; the second using the mean values, representing a higher estimate of delivery costs.

Results

The majority of women were white non-Hispanic (71%), college educated (72%), and under age 40 (77%). The most common female infertility diagnoses were ovarian (39%) and ovulatory (28%); 38% of couples had a male factor diagnosis (Table 1).

Treatment utilization

Among women pursuing cycle-based treatment, 4.3% used MEDS only, 9.8% IUI-C, 11.1% IUI-FSH, and over half (53.3%) used IVF; 21.6% chose not to pursue cycle-based treatment. Six percent used donor eggs for at least one cycle. Among the 212 women who used IVF or IVF-DE, 81 received at least one cycle of ICSI.

Treatments were differentially used by individuals according to their diagnoses and age. Women with ovulatory diagnoses were the least likely to forgo cycle-based treatment (16%). In contrast, women with uterine and ovarian diagnoses were most likely. IVF use was most common among women with a male factor or tubal diagnosis. IVF-DE was most commonly used by women with ovarian diagnoses.

As age increased, the proportion of women who chose to forego cycle-based treatment increased. While the proportion of women using IVF was approximately 50% for all three age groups, a larger proportion of women ≥ age 40 used IVF-DE.

Treatment groups varied in use of treatments prior to study entry. As intensity of treatments prior to study entry increased, the percentage of women in the IVF group increased, from 36.7% of women with no prior treatment to 68.7% of those with prior use of IVF-FSH.

Treatment patterns within treatment groups

The mean number of treatment cycles undertaken during the study period among women who pursued any type of cycle-based treatment was 3.6 (range 1 – 13; Table 2), ranging within treatment groups from 2.7 (MEDS) to 3.8 (IUI-FSH). Differences in the number of treatment cycles between women with and without successful outcomes were noted only for MEDS cycles. Among all women who used cycle-based treatment, and specifically among the MEDS group, unsuccessful women used significantly more MEDS cycles.

Per-person treatment outcomes and costs

Overall, 46.6% of women who pursued cycle-based treatment achieved successful treatment outcomes (105 deliveries; 40 ongoing pregnancies) (Table 3). Success rates within treatment groups were: MEDS 23.5%, IUI-C 38.5%, IUI-FSH 55.6%, IVF 47.3%, and IVF-DE 54.2%. Less than 10% of deliveries were multiple births for IUI-C and IUI-FSH, compared to 40.0% for IVF and 57.1% for IVF-DE.

Among women who pursued any cycle-based treatment (n=312), median treatment cost was $19,690. Cycle-based treatments accounted for two-thirds of the total, medications for 22%, testing and diagnostic procedures for 5%, and surgical procedures for 1%. Median per-person treatment costs increased as treatment intensity increased: MEDS $1,182; IUI-C $3,595; IUI-FSH $8,594; IVF $24,373; and IVF-DE $38,015. Costs accumulated by women with successful and unsuccessful outcomes were not significantly different for any treatment group.

Per-successful outcome costs

Per-successful outcome treatment costs were higher than per-person costs, reflecting the fact that treatment was successful for only about 30%. Considering all women who underwent cycle-based treatment, the cost per success was $48,424 (Table 4). Treatment costs per successful outcome increased as treatment intensity increased: MEDS $5,894; IUI-C $10,696; IUI-FSH $19,566; IVF $61,377; and IVF-DE $72,642.

Lower estimates of delivery costs (using median costs) ranged from $8,151 for MEDS to $16,560 for IVF-DE, yielding total treatment plus delivery estimates of: MEDS, $14,045; IUI-C, $19,898; IUI-FSH, $29,119; IVF, $76,395; and IVF-DE $89,202. Higher estimates for delivery costs (using mean costs) ranged from $12,539 for MEDS to $51,422 for IVF and $60,151 for IVF-DE, yielding total treatment plus delivery estimates of MEDS $18,433; IUI-C $29,186; IUI-FSH $40,041; IVF $112,799; and IVF-DE $132,793. The increasing delivery costs estimates associated with higher intensity treatments reflected the greater proportion of multiple births in those treatment groups.

Discussion

In this first prospective study to examine costs across the full range of infertility treatments, treatment costs ranged from a median cost per successful outcome of $5,894 for MEDS, to $61,377 for IVF, and $72,642 for IVF-DE. While costs for IVF and IVF-DE were highest, per-successful-outcome costs for some of the lower intensity treatments were not insignificant: $5,894 for MEDS, $10,696 for IUI-C and $19,566 for IUI-FSH. These costs may be less important to patients, however, because they are more likely to be covered by health insurance(19).

Collins, reviewing studies of IVF costs, reported median costs of $64,224, with a range of $43,650 to $96,553 (2006 dollars)(3). Our IVF cost estimates are similar, but Chambers, using secondary data sources for cost (e.g., charge surveys) and treatment (e.g., SART),

reported a lower per-live-birth IVF cost of $41,132 (2006 dollars)(4), and Reindollar reported per-delivery charges of $34,806 for “standard treatment” (IUI-C, 3 cycles of IUI-FSH, 3 cycles of IVF) and $29,003 for “accelerated treatment” (IUI-C followed directly by IVF)(20). Differences in these estimates may be attributable to variations in data sources, assumptions made in calculations, types of treatments included, and/or number of treatment cycles included.

Consistent with other researchers(4, 16, 21, 22), we calculated the median delivery cost of multiple births to be $22,866, almost three times higher than a singleton birth, simply based on neonatal hospital length of stay and birth weight. Our estimates of hospital charges were based only on costs associated with surviving singleton births(17). Although we calculated delivery costs for multiples according to the birthweight of each neonate, the costs of singleton deliveries may not be an accurate reflection of the costs associated with multiples of the same birthweight. Multiple births were more common in the IVF and IVF-DE groups (40.0% and 57.1%, compared with 7.1% and 9.5% in the IUI-C and IUI-FSH groups, respectively). For reasons that are unclear, the multiple birth rates in our IUI-C and IUI-FSH groups were substantially lower than rates that have been reported in other studies(23, 24).

The results from this study raise the question of which cost estimates are most realistic to present to patients: costs per cycle, average costs per couple, cost per live birth. Cost per live birth (or per successful outcome, in this study) are important from the perspective of policy-makers or potential third-party payers, but are generally not of primary relevance to patients. The 18-month median treatment cost of $24,373 for individuals who underwent IVF in this study may be a more personally relevant estimate, but it is important to note its caveats. This estimate reflects treatment over a defined time period, not necessarily to a successful pregnancy or delivery, and may be artificially low for women who were unsuccessful during our 18-month study period and continued to pursue treatment. Additionally, couples in our study often had pursued some type of lower intensity treatment prior to presenting to the participating reproductive endocrinology practices, which are not included in our estimates. On the other hand, the per-successful-outcome estimate of $61,377 may overestimate costs for women who become pregnant with one or two IVF cycles, as was common among the women with successful outcomes in our study.

There are limitations to our analysis. Our sample was derived only from Northern California and was relatively homogenous (primarily white, well-education women), but does reflect the characteristics of patients seeking infertility care in the US(25). A large portion of our sample had received some type of testing or treatment prior to enrollment, although we did exclude women who had previously undergone IVF. These individuals may have had a lower likelihood of pregnancy because of previous treatment failures, thus incurring higher costs because of greater difficulties becoming pregnant. Due to concerns about the reliability of retrospective reports of treatments, our cost estimates did not include the costs of treatments received prior to entry into our study, which may result in an underestimation of the full costs of infertility care and may balance the aforementioned potential over-estimates. In addition, it is possible that unsuccessful couples may have continued to pursue treatment, and incur costs, beyond our observation period.

There are also several strengths of this study. Most studies examining the costs of infertility treatment have focused only on the costs associated with IVF. In contrast, we included costs of the whole spectrum of infertility treatment, which may provide a more complete picture of the financial implications of infertility care. We included women from eight diverse reproductive endocrinology practices rather than from a single practice, increasing the generalizability of our results. Cost estimates for our analyses were derived from actual services used rather than estimates from secondary data, and were standardized using

national, rather than practice-specific, data to account for pricing differences among practices and changes over time. Finally, we also estimated the costs of labor and delivery. Because IVF is the primary source of multiple births, and multiple births are so costly, it is critical to include these costs in discussion of the economic impact of IVF. However, we did not collect information on deliveries other than length of stay and number of newborns (e.g., we do not have data on type of delivery), thus our estimates may be inaccurate overall or for specific treatment groups.

While individual patient costs will obviously vary depending on treatments used, number of treatment cycles, and other factors, the cost estimates we present were developed from actual patient treatment experiences, and thus may provide patients with realistic estimates to consider when initiating infertility treatment.

Acknowledgments

Support: Grant HD37074 from the National Institute for Child Health and Human Development (NICHD/NIH)

References

1. Chandra, A.; Martinez, G.; Mosher, W.; Abma, J.; Jones, J. Fertility, family planning, and reproductive health of U.S. women: data from the 2002 National Survey of Family Growth. National Center for Health Statistics. Vital Health Stat. 2005 [Accessed September 24, 2010]. Available at: http://www.cdc.gov/nchs/data/series/sr_23/sr23_025.pdf
2. Centers for Disease Control and Prevention, American Society for Reproductive Medicine, Society for Assisted Reproductive Technology. 2006 assisted reproductive technology success rates: national summary and fertility clinic reports. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2008 [Accessed September 24, 2010]. Available at: http://www.cdc.gov/Art/ART2006/PDF/2006ART.pdf
3. Collins J. Cost-effectiveness of in vitro fertilization. Semin Reprod Med 2001;19:279–289. [PubMed: 11679909]
4. Chambers G, Sullivan E, Ishihara O, Chapman M, Adamson G. The economic impact of assisted reproductive technology: a review of selected developed countries. Fertil Steril 2009;91:2281–2294. [PubMed: 19481642]
5. Collins J, Bustillo M, VIsscher R, Lawrence L. An estimate of the cost of in vitro fertilization services in the United States in 1995. Fertil Steril 1995;64:538–545. [PubMed: 7641907]
6. Eisenberg M, Smith J, Millstein S, Walsh T, Breyer B, Katz P, et al. Perceived negative consequences of donor gametes from male and female members of infertile couples. Fertil Steril 2010;94:921–926. [PubMed: 19523614]
7. Smith J, Walsh T, Shindel A, Turek P, Wing H, Pasch L, et al. Sexual, marital, and social impact of a man's perceived infertility diagnosis. J Sex Med 2009;6:2505–2515. [PubMed: 19619144]
8. Smith J, Eisenberg M, Millstein S, Nachtigall R, Shindel A, Wing H, et al. The use of complementary and alternative fertility treatment in couples seeking fertility care: data from a prospective cohort in the United States. Fertil Steril 2010;93:169–174.
9. Eisenberg M, Smith J, Millstein S, Nachtigall R, Adler N, Pasch L, et al. Predictors of not pursuing infertility treatment after an infertility diagnosis: examination of a prospectve U.S. cohort. Fertil Steril. In Press.
10. Smith J, Eisenberg M, Millstein S, Nachtigall R, Sadetsky N, Cedars M, et al. Fertility treatments and outcomes among couples seeking fertility care: data from a prospective fertility cohort in the United States. Fertil Steril. In Press.
11. American Medical Association. Physicians' current procedural terminology (CPT), 2006. Chicago, IL: American Medical Association; 2005.
12. Katz P, Showstack J, Lake J, Brown RJ, Dudley R, Colwell M, et al. Methods to estimate and analyze medical care resource use. An example from liver transplantation. Int J Technology Assessment in Health Care 1999;15:366–379.

13. Centers for Medicare and Medicaid Services. Physican fee schedule relative value files. 2006 [Accessed September 24, 2010]. Available at: http://www.cms.hhs.gov/PhysicianFeeSched/PFSRVF/list.asp?listpage=2

14. PDR staff, 2006. , editor. Redbook: Pharmacy's fundamental reference. 2006 ed. Montvale, NJ: Thomson PDR; 2006.

15. Callahan T, Hall J, Ettner S, Christiansen C, Greene M, Crowley W. The economic impact of multiple-gestation pregnancies and the contribution of assisted-reproduction techniques to their incidence. N Engl J Med 1994;331:244–249. [PubMed: 8015572]

16. Katz P, Nachtigall R, Showstack J. The economic impact of the assisted reproductive technologies. Nature Medicine 2002 Supplement:S29–S32.

17. Gilbert W, Nesbitt T, Danielsen B. The cost of prematurity: quantification by gestational age and birth weight. Obstet Gynecol 2003;102:499–492. [PubMed: 12962932]

18. Bureau of Labor Statistics. Consumer price index achieved news releases. 2009 [Accessed September 24, 2010]. Available at: http://www.bls.gov/schedule/archives/cpi_nr.htm

19. Mercer Health and Benefits LLC. Employer experience with, and attitudes toward, coverage of infertility treatment. 2006. Available at: http://familybuilding.resolve.org/site/DocServer/Mercer_-_Resolve_Final_report.pdf?docID=4361

20. Reindollar R, Regan M, Neumann P, Levine B, Thornton K, Alper M, et al. A randomized clinical trial to evaluate optimal treatment for unexplained infertility: the fast track and standard treatment (FASTT) trial. Fertil Steril 2010;94:888–899. [PubMed: 19531445]

21. Ledger W, Anumba D, Marlow N, Thomas C, Wilson E. The costs to the NHS of multiple births after IVF treatment in the UK. BJOG 2006;113:21–25. [PubMed: 16398766]

22. Koivurova S, Hartikainen A, Gissler M, Hemminki E, Klemetti R, Järvelin M. Health care costs resulting from IVF: prenatal and neonatal periods. Human Reproduction 2004;19:2798–2805. [PubMed: 15388684]

23. Dickey R, Taylor S, Lu P, Sartor B, Rye P, Pyrzak R. Risk factors for high-order multiple pregnancy and multiple birth after controlled ovarian hyperstimulation: results of 4,062 intrauterine insemination cycles. Fertil Steril 2005;83:671–683. [PubMed: 15749497]

24. Dickey R. Strategies to reduce multiple pregnancies due to ovulation stimulation. Fertil Steril 2009;91:1–17. [PubMed: 18973894]

25. Bitler M, Schmidt L. Health disparities and infertility: impacts of state-level insurance mandates. Fertil Steril 2006;85:858–865. [PubMed: 16580365]

Table 1

Diagnoses, and Female Age within Treatment Groups [a]

		Treatment Group					
	Total cohort (n = 398)	**No cycle-based treatment (n = 86; 21.6%)**	**Medications only, no other intervention (n = 17; 4.3%)**	**IUI-C (n = 39; 9.8%)**	**IUI-FSH (n = 44; 11.1%)**	**IVF (n = 188; 47.2%)**	**IVF-DE (n = 24; 6.0%)**
Diagnoses, % (n) [b]							
Male factor	37.7 (150)	20.7 (31) [c]	1.3 (2)	8.0 (12)	5.3 (8)	61.3 (93)	3.3 (5)
Female, tubal	14.6 (57)	21.1 (12)	3.5 (2)	3.5 (2)	3.5 (2)	59.7 (34)	8.8 (5)
Female, uterine	12.8 (50)	28.0 (14)	4.0 (2)	8.0 (4)	14.0 (7)	42.0 (21)	4.0 (2)
Female, ovarian	39.0 (152)	27.0 (41)	2.6 (4)	5.3 (8)	10.5 (16)	40.8 (63)	13.8 (21)
Female, ovulatory	28.2 (110)	15.5 (17)	8.2 (9)	15.5 (17)	20.0 (22)	40.9 (45)	0
Unexplained	9.3 (37)	21.6 (8)	0	27.0 (10)	8.1 (3)	40.5 (15)	2.7 (1)
Age group, % (n)							
≤ 35 years,	48.0 (191)	18.4 (35)	4.7 (9)	13.7 (26)	10.5 (20)	50.0 (95)	2.6 (5)
36-39 years	29.3 (116)	21.6 (25)	2.6 (3)	5.2 (6)	12.1 (14)	53.5 (62)	5.2 (6)
≥ 40 years	22.7 (90)	28.9 (26)	5.6 (5)	7.8 (7)	11.1 (10)	32.2 (29)	14.4 (13)
Treatments prior to study entry, % (n) [d]							
No prior treatment	31.9 (120)	30.0 (36)	3.3 (4)	15.8 (19)	6.7 (8)	36.7 (44)	7.5 (9)
Medications only	35.1 (132)	24.2 (32)	8.3 (11)	10.6 (14)	12.9 (17)	38.6 (51)	5.3 (7)
IUI-C	31.7 (119)	11.8 (14)	0	3.4 (4)	14.3 (17)	64.7 (77)	5.9 (7)
IUI-FSH	17.8 (67)	13.4 (9)	0	1.5 (1)	11.9 (8)	68.7 (46)	4.5 (3)

[a] Subjects were placed into treatment groups according to the highest intensity of treatment they received during the study period.

[b] Diagnosis categories are not mutually exclusive. Definitions of diagnostic groups are as follows:

tubal (e.g., damaged, blocked, removed Fallopian tubes; ectopic pregnancy);

uterine (e.g., intrauterine adhesions, fibroids);

ovarian (e.g., diminished ovarian reserve, “advanced maternal age,” elevated FSH);

ovulatory (e.g., amenorrhea, luteal phase defect, polycystic ovarian disease).

All male diagnoses were grouped together. If no other diagnosis given, diagnosis listed as “unexplained.”

[c] Reflects percent (n) within each treatment (or age) group. Row percentages of treatment groups should sum to 100%.

[d] Treatments prior to study entry are not mutually exclusive, except for "no prior treatment."

Table 2

Number of Per-Person Treatment Cycles during the Study Period, by Treatment Group[a]

	All with cycle-based treatment			MEDS			IUI-C			IUI-FSH			IVF[c]			IVF-DE[c]		
		Successful? [b]			Successful?			Successful?			Successful?			Successful?			Successful?	
	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No
n	311	145	166	17	4	13	39	15	24	45	25	20	186	88	98	24	13	11
Total number of cycles	3.6 (2.5)	3.3 (2.3)	3.8 (2.6)	2.7 (2.4)	**1.0 (0)**	**3.2 (2.6)***	3.1 (2.0)	3.1 (2.0)	3.0 (2.0)	3.8 (2.7)	3.4 (2.1)	4.4 (3.2)	3.7 (2.6)	3.4 (2.5)	3.9 (2.7)	3.5 (2.1)	2.8 (2.3)	4.4 (1.4)
Type of cycle																		
MEDS	0.5 (1.3)	**0.4 (1.0)**	**0.7 (1.5)***	2.7 (2.4)	**1.0 (0)**	**3.2 (2.6)***	0.9 (1.4)	0.9 (1.6)	0.9 (1.2)	0.8 (1.3)	0.8 (1.5)	0.7 (1.2)	0.3 (1.0)	0.1 (0.6)	0.4 (1.2)	0.04 (0.2)	0	0.1 (0.3)
Any MEDS	23.5%	**16.6%**	**29.5%†**	100%	100%	100%	43.6%	33.3%	50.0%	35.6%	32.0%	40.0%	11.8%	8.0%	15.3%	4.2%	0	9.1%
IUI-C	1.0 (1.5)	1.5 (1.6)	0.9 (1.5)	---	---	---	2.1 (1.2)	2.2 (1.1)	2.1 (1.3)	0.9 (1.5)	0.7 (1.4)	1.1 (1.6)	0.9 (1.5)	1.0 (1.6)	0.7 (1.4)	0.4 (0.8)	0.2 (0.6)	0.6 (1.0)
Any IUI-C	39.9%	40.7%	39.2%	---	---	---	100%	100%	100%	37.8%	32.0%	45.0%	33.3%	38.6%	28.6%	25.0%	15.4%	36.4%
IUI-FSH	0.8 (1.4)	0.7 (1.2)	0.9 (1.5)	---	---	---	---	---	---	2.2 (1.7)	1.8 (1.0)	2.6 (2.3)	0.7 (1.3)	0.6 (1.2)	0.8 (1.3)	0.5 (0.8)	0.2 (0.4)	0.8 (1.0)
Any IUI-FSH	36.3%	34.5%	38.0%	---	---	---	---	---	---	100%	100%	100%	32.3%	26.2%	37.8%	33.3%	15.4%	54.6%
IVF	1.0 (1.0)	0.9 (0.9)	1.0 (1.0)	---	---	---	---	---	---	---	---	---	1.5 (0.8)	1.4 (0.7)	1.6 (0.9)	0.8 (1.0)	0.7 (1.0)	1.1 (1.1)
Any IVF	63.7%	64.1%	63.3%	---	---	---	---	---	---	---	---	---	100%	100%	100%	50.0%	38.5%	63.6%
IVF-DE	0.1 (0.5)	0.2 (0.6)	0.1 (0.5)	---	---	---	---	---	---	---	---	---	---	---	---	1.8 (0.8)	1.7 (0.9)	1.8 (0.8)
	7.7%	9.0%	6.6%	---	---	---	---	---	---	---	---	---	---	---	---	100%	100%	100%

[a] all data shown are means (standard deviations) unless otherwise noted

[b] Successful = successful outcome (delivery or ongoing pregnancy) at the end of the 18-month study period

[c] Includes fresh or frozen cycles

* Indicates a significant difference between the means (bolded) of women with and without successful outcomes, p<.05.

† Indicates a significant difference between the proportions (bolded) of women with and without successful outcomes, p<.05.

Table 3

Success Rates and Per-Person Cost Estimates for Treatment (in $)

				Treatment Group				
	All subjects (n = 398)	**No cycle-based treatment (n=87)**	**All who used cycle-based treatment (n=311)**	**Medications only, (n=17)**	**IUI-C (n=39)**	**IUI-FSH (n=45)**	**IVF (n=186)**	**IVF-DE (n=24)**
Treatment outcomes								
Deliveries, % (n)	32.2 (128)	26.4 (23)	33.8 (105)	17.6 (3)	35.9 (14)	46.7 (21)	32.3 (60)	29.2 (7)
Multiple births, % of deliveries (n)	25.0 (32)	4.3 (1)	29.5 (31)	0	7.1 (1)	9.5 (2)	40.0 (24)	57.1 (4)
Ongoing pregnancies, % (n)	10.3 (41)	1.1 (1)	12.9 (40)	5.9 (1)	2.6 (1)	8.9 (4)	15.1 (28)	25.0 (6)
Successful outcomes, % (n)[b]	42.5 (169)	27.6 (24)	46.6 (145)	23.5 (4)	38.5 (15)	55.6 (25)	47.3 (88)	54.2 (13)
Treatment cost, $[a]								
All subjects								
Median [25th, 75th %ile]	15,388 [1,543, 27,640]	890 [364, 1,169]	19,690 [7,548, 34,239]	1,182 [412, 1,953]	3,595 [2,195, 5,924]	8,594 [6,171, 13,414]	24,373 [19,005, 38,344]	38,015 [24,807, 50,233]
Successful								
Median [25th, 75th %ile]	19,765 [11,862, 33,417]	800 [459, 1,352]	19,690 [11,643, 33,119]	925 [540, 1,346]	4,121 [3,440, 5,924]	8,542 [6,328, 11,644]	24,010 [18,846, 36,433]	38,545 [25,437, 43,488]
Unsuccessful								
Median [25th, 75th %ile]	4,448 [785, 23,529]	865 [349, 1,065]	19,640 [3,994, 34,410]	1,519 [386, 2,601]	2,543 [1,606, 5,954]	9,379 [4,835, 17,063]	25,921 [19,495, 41,221]	37,485 [8,026, 71,397]

[a] Treatment costs include costs of tests/diagnosis, surgery, medications, and cycle-based treatment.

[b] Delivery or ongoing pregnancy at end of 18-month study period

Table 4

Estimates of Per-Successful-Outcome Costs

		Treatment Group				
	All who used cycle-based treatment (n=311)	**Medications only, (n=17)**	**IUI-C (n=39)**	**IUI-FSH (n=45)**	**IVF (n=186)**	**IVF-DE (n=24)**
Number of successful outcomes	145	4	15	25	88	13
Treatment cost per successful outcome	$48,424	$5,894	$10,696	$19,566	$61,377	$72,642
Number of singleton deliveries	74	3	13	19	32	3
Number of multiple deliveries	31	0	1	2	28	4
Projected delivery costs						
Median*	$12,497	$8,151	$9,202	$9,552	$15,018	$16,560
Mean*	$37,139	$12,539	$18,491	$20,474	$51,422	$60,151
Total cost per successful outcome						
With median delivery costs	$60,921	$14,045	$19,898	$29,119	$76,395	$89,202
With mean delivery costs	$85,563	$18,433	$29,186	$40,041	$112,799	$132,793

* Projected delivery costs:

Median estimated delivery costs = (number of singleton deliveries × $8,151) + (number of multiple deliveries × $22,866).

Mean estimated delivery costs = (number of singleton deliveries × $12,539) + (number of multiple deliveries × $95,860)