

# Complications of Vasectomies in the United States

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*Physicians in the United States were surveyed in 1983 to gather information concerning the number of vasectomies they performed in 1982 as well as their use of anesthesia and complications of those vasectomies. Most urologists performed vasectomies, whereas family physicians and general surgeons were less likely to do so. As expected, most physicians used local anesthesia, occasionally in combination with a sedative; however, 22 percent of physicians reported using general anesthesia for at least some vasectomies. Complication rates were in the ranges reported by previous case series.*

*Physicians who performed between one and ten vasectomies in 1982 had higher rates of hematoma and hospitalization for treatment of a complication than physicians who performed more vasectomies. Maintenance of surgical skills appears to be important in preventing complications of this usually low-risk procedure.*

Vasectomy is a popular method of fertility control in the United States. Of married women using contraception in 1982, 15.4 percent were relying on the sterilization of their male partner.<sup>1</sup> In 1983 an estimated 412,000 vasectomies were performed in the United States,<sup>2</sup> more than any other urologic procedure.<sup>3</sup> Despite the large number of procedures performed, few epidemiologic data exist characterizing vasectomies performed in the United States. Several recent large studies have shown no substantial risk of long-term complications of the procedure.<sup>4,5</sup> Information on short-term safety has come from smaller case series, however.<sup>6-8</sup> To examine the characteristics of physicians who perform vasectomies and to gather data on the complications that they observe, the Association for Voluntary Surgical Contraception (AVSC), with technical assistance from the Centers for Disease Control (CDC), undertook a survey of physicians in the United States in 1983.

## METHODS

Data from the American Medical Association (AMA) were used to estimate that there were approximately

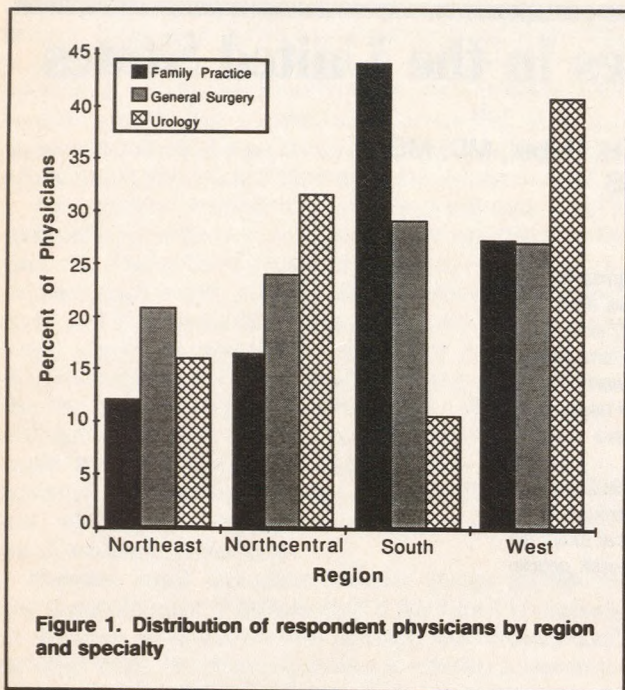
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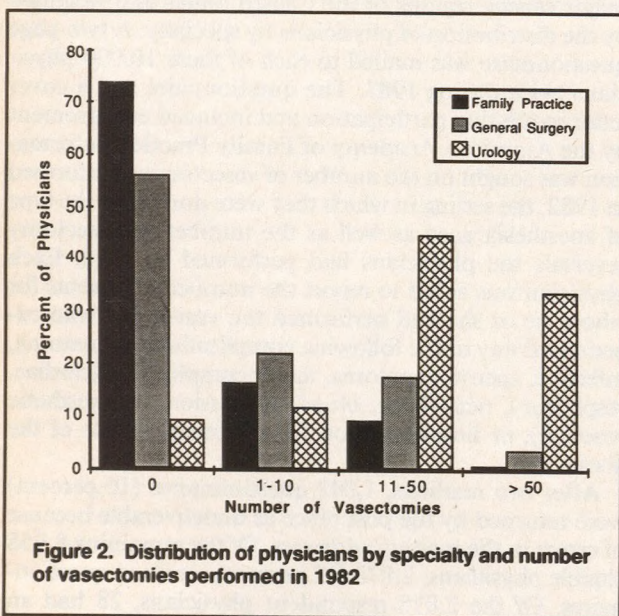
100,000 physicians in the United States who were likely to perform vasectomies, ie, specialists in general or family practice, general surgery, and urology.<sup>9</sup> A 10-percent random sample of physicians in those three specialties (including physicians in private practice, internship or residency, hospital staff, and government service) was generated from the most recently available master mailing list from the AMA. The sample was stratified by the four major census regions of the United States and weighted by the distribution of physicians by specialty. A two-page questionnaire was mailed to each of these 10,000 physicians twice during 1983. The questionnaire had a cover letter requesting participation and included endorsement by the American Academy of Family Practice. Information was sought on the number of vasectomies performed in 1982, the setting in which they were done, and the type of anesthesia used as well as the number of vasectomy reversals the physicians had performed in 1982. Each physician was asked to report the number of patients for whom he or she had performed the vasectomy who experienced any of the following complications: hematoma, infection, sperm granuloma, major complication (cardiac, respiratory, neurologic, blood transfusion, or anesthetic reaction), or hospitalization for treatment of one of the above.

After two mailings, 1,042 questionnaires (10 percent) were returned by the post office as undeliverable because of errors in the mailing addresses. Of the remaining 8,958 eligible physicians, 2,878 (32 percent) returned questionnaires. Of the 2,878 respondent physicians, 28 had an





unknown region or specialty, and eight did not know how many vasectomies they had performed. These 36 were removed from further analyses, leaving 2,842 respondent physicians. A 1-percent random sample of nonresponders



were telephoned; they were similar to the responders in terms of percentage performing vasectomies. To gather further information about the use of general anesthesia 121 physicians who had reported using general anesthesia for vasectomy were also telephoned.

The possible relationship between the rate of each complication (reported number of complications divided by number of vasectomies performed) and other variables was evaluated using linear regression modeling.<sup>10</sup> The following independent variables were used: number of vasectomies performed (1 to 10, 11 to 50, more than 50), physician specialty, setting where performed, and use of general anesthesia (any vs none).

## RESULTS

The distribution of respondents by region and specialty is shown in Figure 1. There were 340 general practitioners, 629 family physicians (these first two categories are combined as "family practice"), 889 general surgeons, and 984 urologists. A higher proportion of family physicians were from the South and a higher proportion of urologists were from the West. Response rates were 39 percent, 22 percent, and 29 percent for urologists, general surgeons, and family physicians, respectively. Of the 2,842 respondent physicians, 1,541 (54 percent) reported having performed at least one vasectomy in 1982, for a total of 65,155 reported vasectomies.

Overall, 31 percent of the physicians who performed any vasectomies did only between one and ten vasectomies per year. As expected, the number of vasectomies performed varied by specialty (Figure 2). Most family physicians (74 percent) performed none, and only 1 percent of them performed more than 50 vasectomies in 1982. General surgeons had a similar pattern, although overall they were more likely to have performed vasectomies. Urologists had the opposite pattern; only 9 percent performed no vasectomies. Family physicians exhibited regional differences: 6 percent of those in the Northeast performed vasectomies, compared with 41 percent of those in the West. The other two specialties did not show any regional differences in the percentage performing vasectomies.

Analysis of the setting in which most vasectomies were performed in 1982 revealed differences by region and specialty. The most common setting used by all three specialties was a physician's private office (64 percent).

The hospital outpatient department was the next most common setting, which was used by 26 percent of physicians. Hospital inpatient facilities were used infrequently by family physicians (1 percent) and urologists (2 percent). Among general surgeons, however, there was higher use



of hospital inpatient facilities, up to 11 percent in the South.

Physicians in all three specialties reported performing vasectomy reversals. Very few family physicians (1 percent) or general surgeons (3 percent) reported performing any reversals, but 60 percent of urologists reported performing one or more in 1982. In this study, a total of 7,838 reversals were reported by respondent physicians.

Overall complication rates for the respondents are shown in Table 1. Only 13 major complications were reported, for a rate of 0.02 percent; further details of these major complications are not available. Because of the small number, these were not subdivided further by physician specialty or other variables.

For each of the four more common complications, the relationship between the complication rate and the other variables of interest was examined. No association was seen between general anesthesia use or setting where vasectomies were performed and any complication. No association was seen between mean infection rate and any other variable.

The mean hematoma rate was significantly higher among physicians performing 1 to 10 vasectomies per year (4.6 percent) than among those performing 11 to 50 vasectomies (2.4 percent) or more than 50 vasectomies (1.6 percent), adjusting for physician specialty. A similar relationship was seen for hospitalization rate: physicians performing 1 to 10, 11 to 50, and >50 vasectomies had rates of 0.8 percent, 0.3 percent, and 0.2 percent, respectively.

Adjusting for number of vasectomies, significantly higher rates of hematoma were reported by family physicians (4.5 percent) and general surgeons (3.0 percent) than were reported by urologists (1.6 percent). No such relationship was seen for hospitalization rate.

Urologists were significantly more likely than either of the other specialty groups to report sperm granulomas.

Physicians were asked about their use of anesthesia for vasectomies performed without any concurrent surgical procedure. Eighty-four percent of physicians reported using local anesthesia for at least some vasectomies, 28 percent reported using local anesthesia combined with sedation, and 2 percent reported using regional anesthesia. Overall, 22 percent of physicians reported using general anesthesia for at least some vasectomies, and 4.5 percent reported using general anesthesia for 50 percent or more of their vasectomies. The highest use of general anesthesia was among urologists, 28 percent of whom reported its use for at least some vasectomies.

Four of the 45 physicians who had reported using general anesthesia for 90 percent or more of their vasectomies on the mail questionnaire denied any use of general anesthesia at the follow-up telephone interview. They apparently had made an error in filling out the mail form. The

TABLE 1. REPORTED VASECTOMY COMPLICATIONS, UNITED STATES, 1982

Complication	Number	Rate*
Hematoma	1266	1.95
Infection	2255	3.48
Sperm granuloma	1593	2.46
Hospitalization	144	0.22
Major complications	13	0.02

\* Per 100 vasectomies

remainder of physicians reporting use of general anesthesia gave a variety of reasons on the telephone, ranging from fear of litigation because of a previous law suit to simple patient preference. Many reported that they felt the procedure was technically easier under general anesthesia and that therefore complications were less likely to occur.

## DISCUSSION

Complication rates in this study were comparable to those previously reported, although this study differs in methodology from the usual case series.<sup>6-8</sup> The rates of major complications and hospitalization for treatment of a complication were reassuringly low. No deaths were reported, although no specific question about death was asked. Physicians who performed fewer vasectomies per year had significantly higher rates of hematoma and hospitalization than those who performed the procedure more often, even when controlling for differences among specialties. Thus, maintenance of surgical skills by performing the procedure more often appears to be important in preventing complications.

Urologists may be more likely to recognize sperm granulomas than other physicians and thus more likely to report higher rates of this complication. In addition, higher rates might be related to variations in surgical technique, which could not be assessed in this study.

The extent of general anesthesia use reported by physicians in this study was unexpected. Only one prior report has noted use of general anesthesia for vasectomy.<sup>11</sup> An expert panel convened by AVSC recommended using local anesthesia without premedication for routine procedures.<sup>\*,12</sup> Overall, no increase was seen in the rate of reported complications among physicians in this study who used general anesthesia. Compared with local anesthesia,

\* On June 6, 1983, a special seminar on vasectomy was convened in New York. At that meeting 12 experts from the United States agreed that the anesthesia of choice for vasectomy is local anesthesia without premedication.



general anesthesia is more expensive, less safe, and results in more loss of work time.<sup>13,14</sup> These concerns may prompt increased use of local, rather than general, anesthesia for vasectomies and other minor surgery.

The number of vasectomy reversals performed each year is unknown, and estimates of the reversal rate (number of reversals per vasectomized men) have varied widely.<sup>15</sup> A total of 7,838 reversals were reported by this sample of physicians; the total number performed in the United States may be even higher. There is a need for better documentation of the reversal rate and better characterization of men likely to request reversal to allow appropriate counseling of men seeking sterilization.

The most serious potential problem with this study is the response rate of only 32 percent. Because of this low response rate, it would be unwise to generalize from this data to national estimates of the number of vasectomies performed by physicians. One other recent study that attempted to characterize practices of US physicians who perform vasectomies found results similar to these concerning the percentages of physicians in the three specialties who perform vasectomies as well as the use of different settings.<sup>16,17</sup> No comparable data exist concerning anesthesia use or complications.

This study relied on busy physicians to report their experience with vasectomies by means of a written mail questionnaire, and thus the study results may have some inaccuracies. Physicians' estimates of the number of vasectomies they perform are probably inaccurate. Asking physicians to report their own complications would not be likely to result in overreporting, so these estimates of numbers of complications are probably minimal. Questions such as setting in which the physician does vasectomies and type of anesthesia used seem likely to have been reported accurately.

Because of the low response rate in this study, these results may not be generalizable to all physicians in the United States who perform vasectomies. The practice characteristics of physicians in this study, however, are similar to those reported previously. The use of general anesthesia, which may be associated with major morbidity, should be further examined; this practice may not be indicated for what is otherwise a low-risk surgical procedure. In addition, maintenance of surgical skills may be important in preventing surgical complications, such as hematoma, and hospitalization for treatment of complications. Further studies to examine the relationship be-

tween anesthesia use, specific surgical techniques, and complications are needed.

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#### References

1. Pratt WR, Mosher WD, Bachrach CA, et al: Understanding United States Fertility: Findings from the National Survey of Family Growth, Cycle III. *Pop Bull* 1985; 39(5):1
2. Kendrick JS, Rubin GL: Vasectomies performed by private physicians, United States, 1980 to 1984. *Fertil Steril* 1986; 46:528-530
3. Rutkow IM: Urological operations in the United States: 1979 to 1984. *J Urol* 1986; 135:1206-1208
4. Massey FJ, Bernstein GS, O'Fallon WM, et al: Vasectomy and health: Results from a large cohort study. *JAMA* 1984; 252:1023-1029
5. Perrin EB, Woods JS, Namekata T, et al: Long-term effect of vasectomy on coronary heart disease. *Am J Public Health* 1984; 74:128-132
6. Staff of the Margaret Pyke Center: One thousand vasectomies. *Br Med J* 1973; 4:216-221
7. Smith GL, Taylor GP, Smith KF: Comparative risks and cost of male and female sterilization. *Am J Public Health* 1985; 4:370-374
8. Leader AJ, Axelrad SD, Frankowski R, Mumford SD: Complications of 2,711 vasectomies. *J Urol* 1974; 111:365-369
9. Eiler MA: Physician Characteristics and Distribution in the U.S. Chicago, American Medical Association, 1983
10. Kleinbaum DG, Kupper LL: *Applied Regression Analysis and Other Multivariable Methods*. North Scituate, Mass, Duxbury Press, 1978
11. Kendrick JS, Rhodenhiser EP, Rubin GL, Greenspan JR: Characteristics of vasectomies performed in selected outpatient facilities in the United States, 1980. *J Reprod Med* 1985; 30:936-938
12. Safety of Voluntary Surgical Contraception. Report of an Expert Committee, Manila, May 9-12, 1983. New York, World Federation of Health Agencies for the Advancement of Voluntary Surgical Contraception, 1984, p 30
13. Meridy HW: Criteria for selection of ambulatory surgical patients and guidelines for anesthetic management. *Anesth Analg* 1982; 61:921-926
14. Miller RD (ed): *Anesthesia*. New York, Churchill Livingstone, 1986
15. Howard G: Who asks for vasectomy reversal and why? *Br Med J* 1982; 285:490-492
16. Orr MT, Forrest JD, Johnson JH, Tolman DL: The provision of sterilization services by private physicians. *Fam Plann Perspect* 1985; 17:216-220
17. Orr MT, Forrest JD: The availability of reproductive health services from United States private physicians. *Fam Plann Perspect* 1985; 17:63-69