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MALE STERILIZATION

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# Vasectomy—Safe and Simple

**Editors' Summary.** Vasectomy—surgical sterilization for men—is one of the safest, simplest, and most effective methods of contraception. Yet in much of the world, vasectomy is a neglected method. Even where vasectomy has been widely performed, as in the US and some Asian countries, the number of procedures has been declining for the last few years. In the past, family planning providers sometimes blamed the low prevalence of vasectomy on male attitudes: "Men are more interested in proving their virility than in taking responsibility for family planning" or "Men are afraid that vasectomy will hurt their sex lives." Now that research has shown no adverse effects in men who have had vasectomies, more attention is focusing on the attitudes of the family planning providers. A few programs deliberately emphasize information and services for men. They have found that many men are willing to share in family planning and that some will choose the permanent method of vasectomy when good services are available.

Most of the 33 million couples of reproductive age who now rely on vasectomy to prevent pregnancy are in four countries—the US, the UK, India, and China. In these countries vasectomy is one of the most widely used contraceptive methods. In the US, for example, vasectomy is almost as common as female sterilization. In India, vasectomy is used by about 12 million couples, representing 10 percent of all married couples of reproductive age. In China, a 1982 survey found that 7 percent of couples of reproductive age—also about 12 million couples—rely on vasectomy. Vasectomy is the contraceptive method of 4 to 15 percent of couples in Thailand, South Korea, Canada, the Netherlands, and New Zealand.

There are several possible reasons for recent declines in the annual number of vasectomies in some of these countries. They include: increasing availability of other methods; new procedures making female sterilization safer and simpler than before (although still more complex than vasectomy); lack of interest among family planning providers, who are usually trained in maternal and child health; publicity about long-term side effects in monkeys—not confirmed in humans, however; and possibly, in developed countries, rising divorce rates.

Vasectomy procedures have changed little in the last decade, and medical problems have been minimal. The procedure takes only 10 to 15 minutes and can be performed in many settings, requiring only local anesthesia. A small incision is made in the scrotum. The vas deferens, the tube that carries sperm from each testis, is identified, severed, and sealed. Thus sperm cannot be expelled. The procedure is extremely effective. Fewer than one vasectomy in 100 fails. Since it takes a number of ejaculations before sperm are cleared from the reproductive tract, couples must use some other contraceptive method for several weeks or months after vasectomy to avoid pregnancy during this interval.

### Health Risks Minimal

Surgical risks are small, and serious side effects are rare. Many men experience minor swelling, bruising, and pain, but these disappear quickly. A few develop infections. Deaths have been rare; they can be virtually eliminated if sterile procedures are followed and men are carefully counseled as to what symptoms require medical attention.

Large-scale epidemiologic studies have now put to rest fears that vasectomized men might face a greater than usual risk of heart disease. These fears were raised by earlier research suggesting that vasectomized monkeys were more likely to develop atherosclerosis (hardening of the arteries) than other monkeys. Eleven studies in humans show no evidence of such an effect. In the largest study, involving over 10,500 vasectomized men and con-

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trols, the vasectomized men had no excess risk of heart attacks, cancer, or diseases of the immune system compared with the control group. In fact, there were significantly fewer deaths during the study period among the vasectomized men. Some of these studies have involved men vasectomized more than 20 years before.

Many vasectomized men develop antibodies to sperm. Such antibodies are uncommon in unvasectomized men. So far there is no evidence that sperm antibodies impair immunity to disease or cause any other health problems, however.

### Reversal

No doubt vasectomy would be more widely used if it were a temporary rather than a permanent contraceptive method. Research in the 1970s on implanted devices for easily reversible vasectomy made little progress, although some work is continuing. Surgical rejoining of the vas restores fertility in about half of reported cases, but pregnancy rates vary widely. A man's chances for successful reversal depend on individual circumstances. The procedure, which may involve microsurgery, is difficult, costly, and not widely available. Thus vasectomy remains a permanent method. Reversibility cannot be guaranteed.

### Encouraging Vasectomy

What can be done to encourage vasectomy where it would be appropriate? The major obstacles are not legal, since only four countries actually prohibit voluntary sterilization. They are not usually financial, since vasectomy costs about half as much as female sterilization. Rather they are intangible, such as:

- religious ambivalence where traditional teachings do not specifically cover modern family planning techniques,
- cultural attitudes or fears on the part of those who might undergo the operation,
- reluctance or misunderstanding on the part of those who might provide the operation.

Traditionally, many men identify continuing fertility with manliness and strength. Also, although vasectomy does not impair sexual performance, many men have doubts. Women sometimes reinforce these attitudes because they too fear some risk to the well-being of the family breadwinner.

While attitudes of potential acceptors may take time to change, attitudes of family planning providers and other programmatic factors can be improved to make vasectomy more attractive and accessible. Several specific factors that are "crucial ingredients to success" for vasectomy programs were identified at the First International Conference on Vasectomy, sponsored by the World Federation of Health Agencies for the Advancement of Voluntary Surgical Contraception and the Government of Sri Lanka in October 1982. These factors include:

- **strong leadership** by an energetic leader personally committed to successful male family planning programs;
- **focused program design**, with vasectomy services separate from female programs;
- **attention to the special needs of men**, including full counseling;
- **appropriate training strategies**, often for an entire surgical team;
- **community-based orientation**, with services located within the community served and using local staff, including men who have had vasectomies;
- **special care** in screening, sterile medical procedures, and follow-up in a sympathetic and respectful manner.

Projects in countries as varied as Bangladesh, Thailand, India, Indonesia, Sri Lanka, Brazil, and Guatemala have used these approaches to register important gains. For example, in Latin America, where vasectomy has never been widely used, two programs have been highly successful. In Guatemala the Asociación Pro-Bienestar de la Familia (APROFAM), an affiliate of the International Planned Parenthood Federation (IPPF), has been doing over 1,000 vasectomies a year in Guatemala City. In 1982 this amounted to more than half of the vasectomies performed by all IPPF affiliates in Latin America. In Brazil, Promoção de Paternidade Responsável, an organization formed in São Paulo in 1981 specifically to promote and provide male methods of contraception, performed over 2,650 vasectomies in 30 months. These examples suggest that men are interested in vasectomy and that they will take advantage of this method if services are offered with enthusiasm and care. **End of Editors' Summary.**

## METHODS

Vasectomy is a simple, minor surgical procedure that takes 10 to 15 minutes plus another 5 to 15 minutes for preoperative preparation and anesthesia (92, 171, 240). The procedure involves making a small opening in the scrotum and severing the vas deferens, the tube that carries sperm from each of the testes to the urethra (see Figure 1). Several vasectomy techniques are currently in use. Since there have been no comparative studies, it is not certain whether any one technique is more effective or safer than the others. With all techniques, however, failures and serious side effects are rare.

### Counseling

Careful and accurate counseling is essential before any client undergoes a vasectomy or tubal ligation. Like all family planning counseling, vasectomy counseling should take place without pressure and in a language that the man fully understands. He should be able to have his wife or another person present if he wishes. Men undergoing vasectomy without adequate counseling may be more likely to experience problems later and to regret the decision (450).

The Association for Voluntary Sterilization (AVS) has established guidelines for prevasectomy counseling. At a minimum, clients should receive the following information:

- A description of the various temporary and permanent methods of family planning, including benefits and risks, failure rates, possible complications, and common side effects.
- An explanation of the permanence of vasectomy. (Occasionally, if services are available, men may undergo surgery to reverse vasectomy, but success cannot be assured; see p. D-78.)
- A statement of the importance of continuing some other method of contraception after vasectomy until a semen analysis shows azoospermia (absence of sperm), until the man has had at least 15 ejaculations, or until six weeks have passed.
- Discussion of possible contraindications to vasectomy and of possible side effects and the failure rate of vasectomy.
- Assurance that withholding or withdrawing consent at any time before the vasectomy will not prejudice future care and will not result in the loss of other program benefits to which the client might be entitled (187, 227).

In addition, every client should clearly understand that vasectomy is not the same as castration. After sterilization men will be infertile but not impotent. There is no known physiological reason for vasectomy to affect sexual behavior (263).

### Preoperative Care

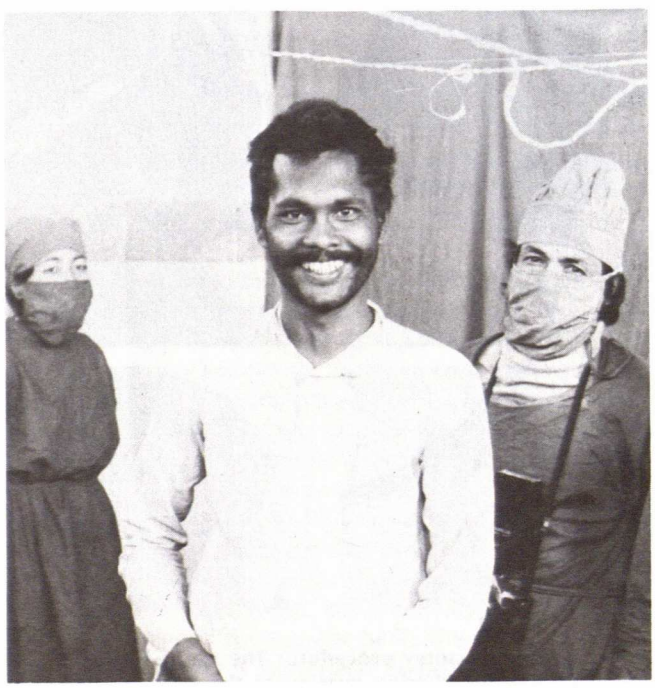
Vasectomy requires little preparation. A simple medical history should be taken and a physical examination conducted before the procedure. Men with severe anemia, diabetes, scrotal pathology such as scabies or hydrocele (collection of fluid in the scrotum), and some systemic diseases should be referred to a well-equipped center for consultation with a specialist (see box, p. D-71).

To minimize infection, the scrotal area should be cleaned thoroughly. The hair should first be shaved or clipped to ¼ to ⅛ of an inch. For cleaning the scrotum, any of several water-based antiseptics can be used. A panel of experts convened by AVS recommended an iodine solution as the most effective antiseptic, although iodine may cause skin irritation in some men (187).

Maintaining sterile conditions reduces the risk of infection. The doctor or other health provider should scrub thoroughly as for any surgery. The AVS expert panel concluded that caps, gowns, and masks are not essential when other aseptic techniques are strictly followed (187). Surgical gloves should be worn (187, 227, 263). After making the incision in the scrotum, the health provider should not touch the vas with his or her hand but instead use only sterile instruments (263). At one time health providers using this "no touch" technique were advised that sterile gloves were unnecessary. If gloves are available, however, they should be worn to reduce the risk of infection. The lack of gloves may have contributed to several deaths from scrotal infection in Bangladesh (see p. D-69).

### Local Anesthesia

Local anesthesia is both safer and less expensive than general anesthesia. Men recover from the local anesthetic rapidly, and complications are rare. The provider injects a small amount—1 to 5 cc—of one percent lidocaine (lignocaine) or similar anesthetic under the scrotal skin and then into the sheath of the vas. Some physicians have injected adrenaline mixed with the anesthetic to reduce bleeding (85, 198, 250). The International Planned Parenthood Federation (IPPF) does not recommend this, since adrenaline may cause prolonged ischemia (obstruction of blood circulation) and postoperative pain (263). Injecting steroids to prevent postoperative swelling also is not recommended (121).



**The vasectomy over, a Nepali man prepares to leave the procedure room. Because vasectomy is simple, requiring only local anesthesia, it is done on an outpatient basis.** (D. Huber/AVS)

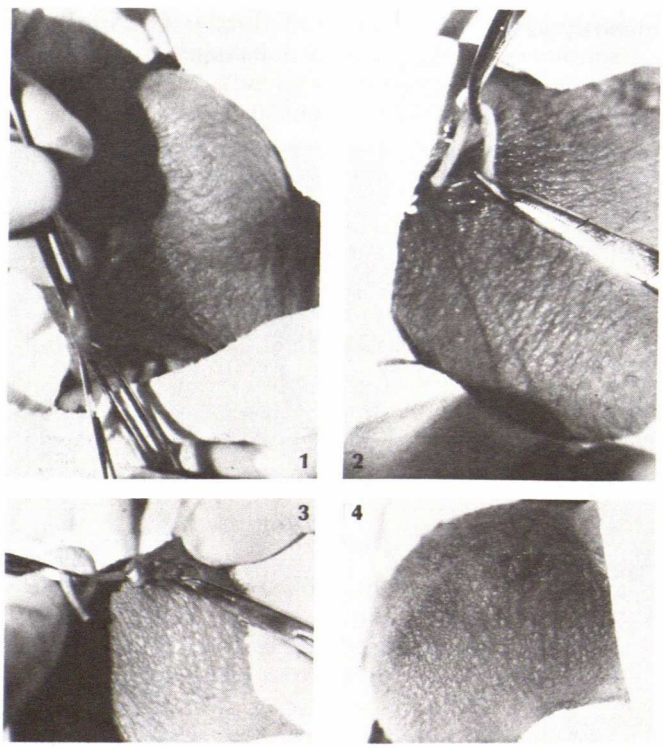
## The Procedure

A vasectomy involves several steps: identifying and immobilizing the vas, making an incision in the scrotum, dividing the superficial layers of tissue and isolating the vas, dividing the vas, usually removing a small section from each vas, sealing the vasal stumps, and finally closing the scrotal incision (see photos below).

The first and most important step is to locate and anchor the vas. The vas lies within the spermatic cord and has an average diameter of about 2.5 mm. It extends from the testis to the external ring in the ligament just above the pubic bone (see Figure 1). To separate the vas from the rest of the spermatic cord, the provider gently pulls the testis downward to draw the cord taut. He or she then feels for the vas at the back of the scrotum with the thumb and fingers of one hand. The vas is a firm, thick tube that can be rolled between the fingers. If the provider cannot feel the vas, he or she should not make an incision (263, 440). About one man in 500 is born with only one vas (440).

The operator can make either one or two incisions of about 2.5 cm in the scrotum. The most common practice is making two incisions, one over each vas (51, 173). IPPF recommends this technique to practitioners who have not had much experience. A more highly skilled practitioner may locate both vasa through a single horizontal or vertical incision at the midline of the scrotum. With a single incision, however, the provider must carefully identify each vas to avoid operating twice on the same one (263).

Some providers excise a small portion of each vas—about one cm. Others simply sever the vas without removing any tissue (103, 440). Any tissue removed should come from the straight part of the vas, high in the scrotum (see Figure 1). Removing a large segment of vas or operating in the convoluted portion of the vas may make reversal more difficult (see p. D-80).




**Steps in the vasectomy procedure: The vas is identified and immobilized (1). Following incision of the scrotum the vas is isolated (2). The vas is cut and a section removed (3). After the ends of the vas have been sealed off, the incision is closed (4).** (Courtesy of Enrico Henriquez)

Irrigating the vas during vasectomy may decrease the postoperative sperm count, but the technique is not widely used (440). A number of different irrigating solutions have been tested (281, 339), including sterile water (69, 110), saline (404), xylocaine (140), euflavine (139, 473, 517), and chlorohexidine (546). Some irrigants have been very effective. With xylocaine, for example, 86 of 100 men had no motile sperm in semen specimens by the fourth day after vasectomy. By 6 weeks all of the men were azoospermic, whereas untreated vasectomized men may not become azoospermic for up to 10 weeks (140, 262). With other solutions results have been less favorable. While irrigants may shorten the period of fertility after vasectomy, they may also occasionally contribute to vasectomy failures or cause side effects. In one study recanalization (rejoining of the vas) was slightly more common after vasectomies involving irrigation with euflavine than after vasectomies involving no irrigation (139). Also, irrigation may injure the tissue of the vas, causing blood to appear in the ejaculate or urine (139).

The ends of the vas can be sealed in several ways:

- by ligation,
- by coagulation with electricity (called electrocoagulation or electrofulguration) or heat (called thermocoagulation), and
- by clips (see Figure 2).

Ligation is the oldest and most widely used technique. Both absorbable and nonabsorbable sutures have been used. According to a 1977 survey of 37 US family planning clinics, absorbable chromic catgut sutures are most common (173). Nonabsorbable materials, including silk (84, 173, 250, 280), cotton (173, 219, 277), and linen (449), also are considered safe but may sometimes cause tissue irritation or granulomas (134, 434). Any type of suture that is tied too tightly, however, can cut through the vas and allow sperm to leak into surrounding tissue, causing a granuloma (263).

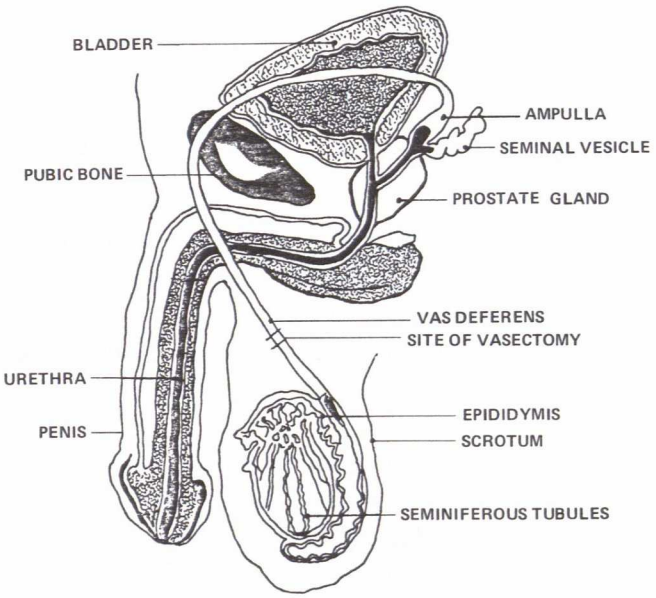
Any of several techniques can be used to prevent the severed ends of the vas from rejoining: the vas may be doubled back and sutured onto itself; the ends may be turned away from each other; or the sheath of the vas can be pulled over one end, creating a barrier of fascial (connective) tissue (295). According to some practitioners, burying the end of the vas in fascial tissue after any method of sealing the vas is the most effective way to prevent recanalization (120) (see p. D-66–67).

Coagulation with a needle electrode (electrocoagulation) creates a hard scar that seals the end of the vas. Stanwood Schmidt has developed a technique that minimizes damage to the muscle of the vas, thus reducing the possibility of subsequent vasal rupture. The needle electrode is inserted 2 mm into the lumen on the urethral side of the vas. As the current is turned on, the needle is withdrawn in one to two seconds. On the testicular side of the vas the needle is inserted 4 to 5 mm into the lumen. The current affects only the mucosa and underlying cells lining the lumen. After electrocoagulation the sheath of the vas is closed over the urethral end with a single suture (435, 442).

Applying tantalum clips is another method of blocking the vas. They are rarely used. Tantalum is a nonabsorbable, biologically inert metal that does not cause an inflammatory response in body tissues (327). Some providers cauterize the ends of the vasa before applying the clips (328). Others have applied clips without severing or removing any portion of the vas (103, 194). Two clips on the testicular end of each vas block sperm more effectively than one clip (194, 278, 328). The clip technique was at first thought to be more reversible than other methods (327). In fact, however, the clips are very difficult to remove, and the underlying tissue is so damaged that it must be removed (194, 271). Thus, reversal of clip vasectomies, like reversal of other methods of vasectomy, involves surgical rejoining of the cut ends of the vas, with no greater guarantee of restored fertility (see p. D-78).

After the vasa are sealed and the sheath covering each vas is closed, the scrotal incision is closed. Most physicians use absorbable sutures such as catgut. Nonabsorbable sutures must be removed in a few days, and minor infection is more common (78). A small incision, about one cm or less, does not require suturing (263).

**Figure 1. Male Reproductive System Showing the Site of Vasectomy**




### Postoperative Care

Postoperative care is simple. After the procedure the client should rest for one to two hours in the clinic if possible and then rest for several hours at home (51, 53, 185, 263). Men should avoid hard work or strenuous exercise for two or three days after surgery (8, 263). Wearing a scrotal support for seven or eight days and taking mild painkillers can ease postoperative discomfort (53, 185). The incision heals quickly—usually in about a week to 10 days (118). Swelling, tenderness, and/or pus at the site of the incision are signs of infection and should be reported to health workers immediately (53). As soon as the man feels comfortable, he can have sexual intercourse (449).

### Delayed Infertility After Vasectomy

Vasectomy, unlike female sterilization, does not result in immediate infertility. Sperm stored in the male reproductive tract on the urethral side of the obstruction must be expelled before a couple is protected from pregnancy. Complete expulsion of sperm may occur by one week after a vasectomy or may take 10 weeks or more, depending partly on the frequency of ejaculation (310, 312, 340). In the largest study to date, involving 900 vasectomized men, about 95 percent were azoospermic at 10 weeks after surgery (262). Some other studies report longer intervals (246, 312). Even if sperm appear in the ejaculate, however, most men are infertile when the sperm are not motile. Two studies report that by two weeks after vasectomy only 2 percent or less of men had motile sperm (57, 246). A few men may still be fertile. Pregnancies more than a month after vasectomy have been reported (299, 308).

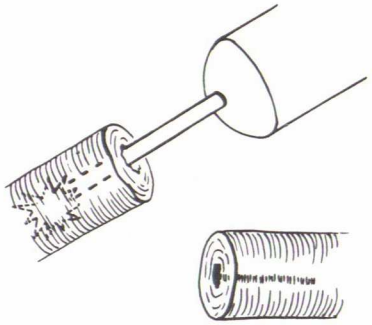
There is no accepted standard for either the time interval after surgery or the number of ejaculations before infertility is achieved. In the US, men are often asked to submit a semen specimen to be checked for sperm six to eight weeks after the vasectomy (173). In India some physicians tell men to use other contraception for three months and then report to the clinic for a check of semen (273, 449). In most developing countries men are usually told to wait for a certain number of ejaculations before abandoning other contraceptives, since men rarely return for follow-up clinic appointments (128, 220, 449, 477). For example, in Bangladesh men are routinely given 12 or more condoms after vasectomy (51). IPPF recommends that, if semen cannot be checked, men should use other birth control methods for at least 20 ejaculations (263). AVS recommends at least 15 ejaculations or six weeks after the procedure (187, 227).

### Equipment

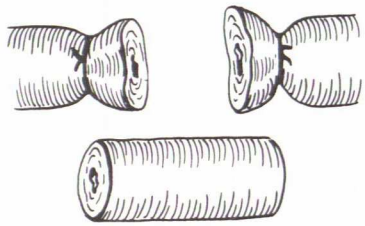
When ligation is used to close the vas, vasectomy requires only very basic instruments—two forceps or clamps to grasp the vas, a syringe, a scalpel or razor blade, a needle, and suture material (see **Population Reports**, *Vasectomy—Old and New Techniques*, D-1, December 1973, and *Guide to Equipment Selection for M/F Sterilization Procedures*, M-1, September 1977). The US Agency for International Development (US AID) has prepared a basic kit for vasectomy by ligation. Over 10,000 kits have been sent to developing countries since 1972 (539). UNICEF provides a similar kit to UN-assisted projects (515). Electro- and thermocoagulation call for more complicated equipment and require electrical current. For electrocoagulation, electrosurgical units convert the low-frequency line current from a wall outlet to a high-frequency current. There are two types—monopolar and bipolar. With monopolar electrocoagulation, electrical current flows from the electrosurgical unit through the patient to a ground plate under the patient's buttocks. The high current density may damage tissue surrounding the vas (165). By contrast, with bipolar electrocoagulation, current flows only between the two poles of the operating instrument, thus using a minimum of electrical power and making it easier to limit the extent of coagulation. The majority of providers use monopolar electrocoagulation, however, since bipolar units are not readily available (335, 440). With thermocoagulation equipment, no electricity flows through the tissue. Instead the current heats the metal tip of the device, and the vas is cauterized by heat.

Battery-powered devices have been developed to eliminate the need for line current. A US company, Concept,

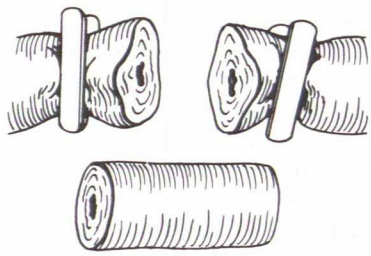
## Figure 2. Various Techniques of Sealing the Vas



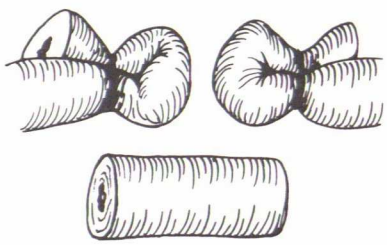
Electrocoagulation of the mucosa in both ends of the vas



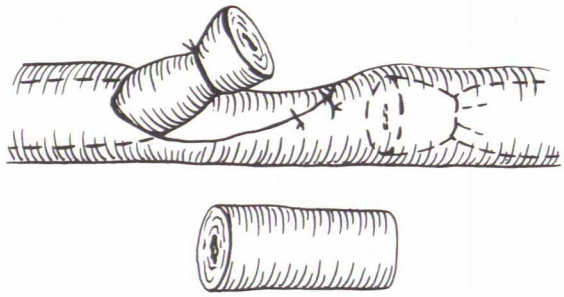
Removal of a segment of vas and simple ligation



Removal of a segment of vas and application of metal clips



Removal of a segment of vas and both ends tied back on themselves



Removal of a segment of vas, ligation, and closing of the fascia over one end of the vas

Source: adapted from R. Kessler. Vasectomy and vasovasostomy. Surgical Clinics of North America 62(6): 971–980. December 1982.

Inc., has developed the Vasector, a thermocoagulation unit. A box of 10 sterilized units, each in sterile packaging, costs $71.50 (US). Because the user cannot sterilize the unit, the manufacturer recommends that it be discarded after one use (189). A bipolar electrocoagulation apparatus, the VASeal unit, was developed in the 1970s by Electro Medical Systems in collaboration with Battelle Pacific Northwest Laboratories, but it is no longer produced (113).

## EFFECTIVENESS

Vasectomy is among the most effective methods of contraception, with pregnancy rates similar to those for female sterilization and lower than those for reversible methods. In large studies failure rates have ranged from 0 to 2.2 percent, and in most studies they are less than 1.0 percent (55, 65, 176, 252, 262, 275, 278, 279, 288, 318, 428). While other contraceptive methods are now evaluated on the basis of the number of pregnancies either per 100 women after one year of use or per 100 woman-years, most studies of vasectomy report only the number of pregnancies per 100 procedures. Thus close comparisons with other methods are difficult, but clearly vasectomy is a highly effective method.

Vasectomy failures usually are due to:

- unprotected coitus before the reproductive tract is cleared of sperm,
- spontaneous recanalization of the vas,
- division and occlusion of the wrong structure during surgery,
- rarely, congenital duplication of the vas that went unnoticed during the procedure.

Unprotected intercourse shortly after vasectomy is thought to be a common cause of pregnancy after vasectomy. All vasectomy clients should be clearly warned of the problem and told to use condoms or other contraceptives.

Spontaneous recanalization, or rejoining of the vas, usually follows formation of a sperm granuloma, an inflammatory response to sperm that leak from the vas (see p. D-70). Narrow channels develop within the granuloma. Occasionally these channels can reconnect the two ends of the vas or form a duct between them, allowing sperm to pass through the vas into the ejaculate. Spontaneous recanalization can occur as early as three to four months after vasectomy and has been reported up to two to three years after the operation (210, 278). Recanalization is not always permanent. Scar tissue can close the channels in the granuloma, and the man will again be infertile (466).

The vasectomy technique may affect the chances of spontaneous recanalization, although controlled comparative studies have not been conducted. Simple ligation of the vas, even if the cut ends are doubled back and sutured, is most likely to result in recanalization, since sperm granulomas often develop. Separating the two ends of the vas

by a layer of fascia derived from the sheath of the vas may reduce the number of failures but does not completely eliminate them (8, 141, 318, 328, 400, 435). In a series of over 4,200 vasectomies Stanwood Schmidt reported 5 failures in the first 150 cases, where the vas was simply excised and ligated. By contrast, there have been no reported failures in over 4,000 subsequent cases when the ends of the vas were ligated or coagulated and the distal end was buried in the fascial sheath (435, 440).

According to some researchers, operating on the wrong structure is also a major reason for vasectomy failure (203, 449). Scrotal scarring from prior surgery may make detecting the vas and operating on the scrotum more difficult (433). Also, hardened lymphatic ducts or thrombosed veins following filariasis infection may be mistaken for the vas (449). With experience, however, surgeons should have no trouble identifying the vas and distinguishing it from other structures (137). Mistakes are more likely when surgeons are learning the technique or when they do not perform vasectomies frequently (118, 479).

Congenital duplication of the vas occurs very rarely (55). Thus it probably accounts for an extremely small proportion of vasectomy failures (55, 433, 449).

## SHORT-TERM SIDE EFFECTS

Vasectomy is a safe and simple procedure. Short-term or postoperative side effects are minor, and most subside within one or two weeks. The most common complaints

## *Experimental Methods of Blocking the Vas*

Current research on new methods of male sterilization is focused on developing an inexpensive, quick procedure that requires no surgery, uses few instruments, and can be easily performed by paramedical personnel. The most promising techniques involve puncturing the vas percutaneously (through the skin) with a needle or needle-like instrument. The vas lumen can then be scarred or blocked by chemical agents, electro- or thermocoagulation or, theoretically, by ultrasound or cryosurgery (using a probe containing an extremely cold substance) (119).

Percutaneous vas occlusion is much less destructive to the vas than vasectomy. The scrotum and vas are not cut in these procedures. Thus they may cause less pain and fewer complications. They also may be more acceptable to men who fear surgery. Failure rates, however, may be higher than with other vasectomy techniques. Also, since the vas is not exposed, providers must locate and block the vas by touch. Thus percutaneous methods may be more difficult to teach and to learn than conventional vasectomy techniques. The consequences of a near-miss injection with a chemical scarring agent have not been fully determined. Finally, the potential for surgical reversal is not known (107, 119).

Chemical agents to block the vas that have been tested in animals include ethanol, formaldehyde, silver nitrate, and methyl-2-cyanoacrylate (MCA) (107, 119, 402). In three small human trials in the US a solution of ethanol and formaldehyde failed to block sperm in 10 to 56 percent of men (107, 119). The high failure rate was attributed to difficulty in isolating the vas and injecting the solution into the lumen. The lowest failure rate was achieved using a special clamp to hold the vas during the procedure. The men experienced little discomfort and no complications. Follow-up, however, has been too short to identify any long-term side effects. Unless failure rates can be reduced to one or two percent, the procedure will not be an acceptable alternative to surgical vasectomy (165, 402).

Chemical agents have been used extensively in China since 1971. Over 300,000 such procedures have been carried out, 70,000 in Sichuan province alone (402, 455, 545). A failure rate of 9 percent was reported in an early study (5). The Chinese currently use phenol-based compounds. Animal studies with these compounds are about to start in the US (402).

The Program for Applied Research on Fertility Regulation (PARFR) is supporting research on a bipolar needle for percutaneous electrocoagulation. The needle uses little electrical power and destroys only the mucosa and one or two muscle cell layers of the vas. Small preliminary studies in humans have been encouraging. The procedure is reported to be painless and easy. The chief problem so far is keeping the reusable needle electrode sharp enough to penetrate scrotal skin (182).

### Intravasal Devices

During the 1970s researchers tried to develop a device that could be easily implanted in the vas and later removed or opened to allow sperm passage. Over 20 intravasal devices were investigated in the US, India, and South Korea (166). Interest waned as problems with intravasal devices arose and promising microsurgical methods of vasectomy reversal were developed. By 1980 only a few projects remained active. The surgical technique for implanting valves often proved to be difficult. Given the elastic nature of the vas, developing a plug that adequately blocked sperm also was difficult (166).

Extensive animal studies have been carried out on a device called the shug. It consists of two silicone plugs connected by a nylon thread. The plugs are inserted approximately 0.5 cm apart by a needle through the vas wall, and the thread runs outside the vas. A sheath is then formed around the plugs using the fascia of the spermatic cord. Pulling the plugs out by the thread restores the patency of the vas. Insertion and removal are minor surgical procedures, and the device has minimal effect on the physiology of the vas. In animal studies the shug has been inserted and removed successfully, with sperm returning to the ejaculate. Clinical trials in humans are expected to start soon. The advantage of the shug over surgical vasectomy and percutaneous vas occlusion is that it may be easier to reverse (547).

after surgery are swelling of the scrotal tissue, bruising, and pain. More serious complications such as infection and hematoma occur in less than 3 percent of men. Deaths are extremely rare and in most cases can be avoided by very careful sterile technique during surgery and proper care of the incision after surgery.

### Bruising, Swelling, and Pain

As many as half of the men undergoing vasectomy experience some bruising, swelling, and pain. These symptoms are rarely severe. They almost always disappear without treatment, although bruising and swelling may last up to two weeks (263). Bruising is caused by seepage of blood under the skin when the anesthetic needle punctures small blood vessels.

Many men experience tenderness or a dragging sensation in the scrotum for up to a week after vasectomy. Surgical manipulation of scrotal tissue and subsequent swelling cause this discomfort. Usually the only treatment required is scrotal support and mild painkillers such as aspirin (449). Severe pain may indicate infection or formation of a hematoma (263).

### Hematoma

Hematoma, a mass of clotted blood in the scrotal tissue, generally occurs in less than one percent of vasectomized men, but it has been reported in as many as 4 percent (13, 55, 65, 176, 230, 252, 262, 275, 278, 279, 288, 318, 328, 374, 469, 478). Hematomas form when blood vessels in the subcutaneous layers of the scrotum are injured and bleed into the scrotal sac. The lax scrotal tissue expands, permitting persistent bleeding that may lead to a large hematoma (78, 263, 449). If the hematoma goes untreated, pain and infection can result (78, 203, 263).

Hematomas can be prevented by ensuring that bleeding from all vessels has been stopped at the end of the procedure. Also, men must be careful not to strain the scrotal sac for several days after surgery. They should rest for several hours after the procedure and avoid hard work for two days (263). Small hematomas usually resorb completely with bed rest. The best treatment of large hematomas is uncertain. Some physicians drain large or growing hematomas to try to prevent infection (53, 121, 263, 440, 449). Others prefer to delay surgery, since operating, particularly where it is difficult to maintain sterile conditions, may itself increase the risk of infection (335).

**Failure to use some other method of contraception for the first few months after vasectomy may be the major reason for unplanned pregnancies. Thus vasectomy counseling should emphasize temporary use of another method. Here, Indonesian men about to have vasectomies learn about condoms.** (Courtesy of World Neighbors)

### Other Minor Complications

Epididymitis, or swelling and tenderness in the testes, occurs in less than one percent of vasectomies (13, 55, 65, 278, 279, 288, 328, 374, 469, 478). In vasectomized men epididymitis may occur because sperm production exceeds absorption in the epididymis, and the epididymal tubules become engorged with sperm. Bacterial infection is rare (433). If the tubules burst, however, an epididymal granuloma may form (see p. D-70) (288, 445, 460, 465, 467). Epididymitis usually occurs soon after the procedure but can occur as long as several months later. Applying heat to the testes and wearing a scrotal support is the recommended treatment. Symptoms usually subside within one week (278, 328, 433).

Other side effects of vasectomy—all extremely rare—include vascutaneous adhesions (fibrous bands connecting one end of the vas to the scrotal wall), hydrocele (collection of fluid around the testes, epididymis, or vas), and vascutaneous fistula (adhesions that erode an opening in the scrotal wall). Each of these side effects occurs in less than one percent of vasectomized men (230, 278, 374, 469). In a series of 2,711 vasectomies, for example, only 2 cases of hydrocele and 15 cases of vascutaneous fistula were reported (278). Orchitis (inflammation of the testes) is sometimes reported, but most diagnosed orchitis is actually epididymitis (440).

### Infection

Infection after vasectomy is not frequent. Generally less than 2 percent of vasectomized men develop infection, although rates as high as 6 percent have been reported (13, 55, 65, 175, 176, 252, 275, 278, 279, 288, 318, 328, 374, 478). Most common are superficial skin infections, usually around the site of the incision or skin sutures. They appear three to four days after the procedure. This wound sepsis is more likely when nonabsorbable sutures are used instead of catgut (78). Abel Leader and colleagues reported fewer cases of cellulitis (inflammation of cellular or connective tissue) when skin sutures were avoided entirely (278). Deep infections of the vas or epididymis are very rare but can occur up to six months later and occasionally require prolonged antibiotic treatment (278, 298).

Treatment depends on the severity of the infection. Superficial infections at the wound site often heal without treatment. If pus forms around the incision, it should be allowed to drain. Skin sutures may have to be removed. If antibiotics are necessary, bacteria should be cultured to determine the appropriate drug. If facilities for culturing bacteria are not available, a broad-spectrum antibiotic should be used. In rare instances an abscess may need to be opened and drained (263).

There is no evidence that providing antibiotics to all vasectomy clients helps to *prevent* infection. A small study in Bangladesh found no difference in the rate of complica-

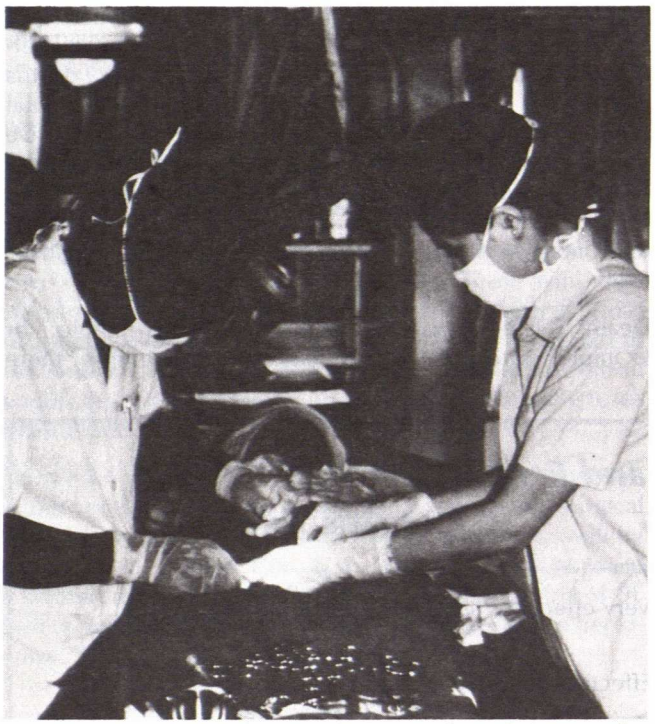
tions, including infection, among men who took antibiotics after vasectomy and those who did not (257). According to V.N. Shrikhande, the quality of sterile technique during surgery, not the use or nonuse of antibiotics, determines the incidence of infection (449).

Between 1979 and 1981 seven deaths from scrotal infections after vasectomy were reported in Bangladesh. The type of infection is not known. During this 2-year period approximately 36,500 vasectomies were performed, yielding a mortality rate of about 19 deaths per 100,000 vasectomies. Three of the deaths occurred at one clinic with the same surgeon performing the vasectomies, suggesting a breach of sterile technique (191, 192). Later, between April 1981 and July 1983, over 170,000 vasectomies were performed, and five deaths occurred, for a rate of 2.9 deaths per 100,000 procedures. It is not known whether scrotal infection caused these deaths (72). In India in 1971 five deaths due to tetanus infection of the vasectomy site were reported among 62,000 men who had had vasectomies at a Family Welfare Festival (3). These deaths may have been associated with contaminated powder on surgical gloves (384).

Deaths related to vasectomy should be preventable. For example, in the US, where vasectomy is common, there

## *Comparison of Vasectomy and Female Sterilization*

| VASECTOMY | FEMALE STERILIZATION |
|---|---|
| **Effectiveness** | |
| Very effective, but slightly higher rate of spontaneous recanalization and pregnancy. | Very effective; slightly lower failure rate. |
| Effective 6 to 10 weeks after surgery. | Effective immediately. |
| **Complications** | |
| Procedure involves almost no risk of internal injury or other life-threatening complications. | Procedure involves slight risk of serious internal injuries and other life-threatening complications. |
| Very slight possibility of serious infection. | Slight possibility of serious infection. |
| No anesthesia-related deaths. | Few anesthesia-related deaths. |
| **Acceptability** | |
| Minute scar. | Scar can be small but still visible. |
| Slightly more reversible. | Slightly less reversible. |
| Less expensive. | More acceptable in many cultures. |
| **Personnel** | |
| Can be performed by one trained person with or without an assistant. | Team needed, including one doctor, one trained anesthetist, and at least two assistants with more training than needed for vasectomy assistant. |
| Safely performed by trained paramedics. | More difficult for paramedics to learn and to perform. |
| Can usually be performed in half the time of most female sterilizations. | Usually only physicians with training in gynecology can perform laparoscopy and laparotomy. Minilaparotomy is simpler. |
| **Equipment** | |
| Requires no specialized equipment. Equipment readily available. | Laparoscopy requires expensive, complex equipment, which needs to be carefully maintained. Minilaparotomy requires only simple standard surgical instruments. |
| Can usually be performed under local anesthesia. | Systemic sedation necessary as well as local anesthesia. |
| **Back-Up Facilities** | |
| No back-up facilities needed for immediate complications. | Back-up facilities needed in case of damage to abdominal organs and blood vessels or other complications that require laparotomy. |
| **Possible Long-Term Side Effects** | |
| None demonstrated. Uncertainty about effect of increase in sperm antibodies. | Slight risk of ectopic pregnancy. |



**Vasectomy is a safe, minor surgical procedure. Safety can be assured by following meticulous sterile technique. The operator should wear sterile gloves to prevent infection.** (Steven Smith)

have been no reported deaths (405). The most important preventive measures are:

- good preoperative care, including very careful cleaning of the scrotal skin and application of a standard antiseptic;
- proper sterilization of surgical equipment and drapes;
- meticulous maintenance of sterile technique during surgery;
- use of sterile gloves, if available, even if the operator intends to use the "no touch" technique, in which only sterile instruments touch the vas (191);
- comprehensive counseling, so that the client will understand the appropriate postoperative care and will recognize the symptoms of infection—swelling, tenderness, or pus—that require medical attention immediately (191);
- follow-up care when needed.

### Sperm Granulomas

A granuloma is a nonbacterial abscess consisting largely of sperm, epithelial cells, and lymphocytes (95, 443). It is an inflammatory response to sperm leaking into surrounding tissue and can occur either *at the site of the vasectomy* or *in the epididymis*. While most granulomas are small and unimportant, occasionally problems occur:

- Channels may develop through the granuloma, forming a new passageway for sperm and restoring fertility (see p. D-66).
- A small proportion of men with granulomas experience mild to severe pain.
- Epididymal granulomas may prevent successful vasectomy reversal.

The incidence of sperm granulomas is not known. Since granulomas rarely cause symptoms and often are not palpable, they frequently are not diagnosed (295). In studies of 500 or more men undergoing vasectomies, for example, granulomas were reported in 0 to 3 percent (55, 142, 176, 186, 188, 262, 278, 279, 318, 499). During vasectomy reversal procedures, however, granulomas at the vasectomy site have been found in about 15 to 40 percent of cases (433, 439, 460, 464, 500); granulomas of varying sizes in the epididymis have been reported in 10 to 50 percent (433, 445). Granulomas have been diagnosed shortly after surgery—in two to three weeks—or as long as 25 years later (443).

Up to 10 percent of men with sperm granulomas may experience some symptoms (443). The most common complaint is a tender nodule at the cut end of the vas or in the epididymis. Some men develop discomfort at the site of the granuloma particularly during sexual excitement or ejaculation (78, 437). In most cases discomfort from a granuloma subsides spontaneously (443). Conservative treatment with mild analgesics or anti-inflammatory medication and bed rest is often enough. In rare cases granulomas must be evacuated surgically, and, if necessary, the testicular end of the vas must be resealed (440).

Granulomas *at the vasectomy site* are more likely to occur when the vas is not completely sealed. This happens more frequently when the vas is closed by ligatures than by electrocoagulation (262, 442). Tightly tied sutures can cut the vas, permitting leakage of sperm. Also, absorbable sutures can dissolve before scar tissue forms over the vas, while nonabsorbable sutures may themselves provoke an inflammatory reaction, causing a granuloma (95). Occasionally a buildup of pressure behind the cut end of the vas may rupture the incision. This may occur less frequently with electrocoagulation than with ligation, since scar tissue produced by electrical current forms a tight seal. In a series of 1,000 vasectomies with electrocoagulation, Stanwood Schmidt and Michael Free reported only four symptomatic granulomas at the vasectomy site. In an earlier series of vasectomies with ligation, 12 of 288 men—4.2 percent—developed granulomas (440, 442). When ligatures are used, tying back the proximal end of the vas onto itself may be more effective in preventing granulomas than just suturing the end shut (262).

Generally, physicians have sought to prevent granulomas at the vasectomy site because they may cause pain and may permit spontaneous recanalization (443). Granulomas *at the site of vasectomy*, however, may have some advantages. They are a reservoir for sperm and so may prevent buildup of pressure in the epididymis. Thus, granulomas *at the site of the vasectomy* may help to prevent *epididymal* granulomas or obstructions, which can damage sperm cells (445, 460, 465). *Epididymal* granulomas may cause testicular pain and inflammation. They also may obstruct the passage of sperm and reduce the chances for a successful vasectomy reversal. In a series of 92 men undergoing reversals, Sherman Silber found sperm granulomas at the vasectomy site in 32 percent. Among these men, 92 percent had normally shaped sperm in the vas fluid. By contrast, only 7 percent of the men without granulomas at the vasectomy site had mostly normal sperm in the vas fluid, and another 22 percent had both normal and abnormal sperm. Twenty-six percent of those without granulomas at the vasectomy site had no sperm in the vas fluid (465). Thus epididymal obstruction seems more likely when there are no granulomas at the vasectomy site.

## LONG-TERM SIDE EFFECTS

Vasectomy poses little if any long-term risk to men's physical or mental health. Concern about potential side effects stems from two sources:

- reports that vasectomized monkeys are more likely to develop atherosclerosis (accumulation of fatty material on the walls of arteries) than unvasectomized monkeys.
- the theoretical question whether the constant antibody response to sperm in vasectomized men affects the immune system and increases the risk of autoimmune disease (disorders of the immune system, such as lupus and rheumatoid arthritis, in which the body produces antibodies against its own tissues).

To date, however, large epidemiologic studies in men show no excess risk of artherosclerosis or other cardiovascular disease. Also, although few studies have been long enough or large enough to be definitive, there is no evidence for any increase in immune disease. After vasectomy the immune system continues to function normally, and the male reproductive organs and hormone production are unaffected. Also, most men experience few psychological side effects, and their marriages are unchanged.

### Animal Studies

Two studies in monkeys have shown an increase in atherosclerosis after vasectomy. In 1978 Nancy Alexander and Thomas Clarkson reported that five vasectomized monkeys fed a diet very high in cholesterol developed significantly more atherosclerosis than five control monkeys fed the same diet (20, 101). A second study examined 10 monkeys vasectomized 9 to 14 years earlier and 8 unvasectomized controls, all fed a low-cholesterol diet (102). The vasectomized monkeys again had significantly greater atherosclerosis, particularly in the thoracic aorta, than the controls. Clarkson and Alexander hypothesized that damage to inner arterial walls caused by deposits of circulating immune complexes (see p. D-75) allowed greater accumulation of atherosclerotic plaque (fatty material) (102).

These findings in rhesus monkeys must be interpreted with caution. Most importantly, no excess risk of circulatory system disease has been found in humans (see below). Also, only a small number of monkeys were observed, and the extent of atherosclerosis and sperm antibody production before vasectomy was not studied (41, 285). There is no evidence that sperm antibodies are related to the accumulation of plaque in men or monkeys. In the second study sperm antibodies were detected in only 4 of the 10 vasectomized monkeys, even though all had plaque buildup (102). In neither study were the animals tested for circulating immune complexes (41).

A recent study found a higher incidence of benign and malignant tumors in various tissues, particularly in the liver, in one strain of vasectomized mice than in controls. The animals that developed antibodies to sperm after vasectomy were more likely to develop tumors and to develop large tumors than animals who did not develop antibodies (31). The applicability of these findings to humans is unknown. The strain of mice under study has a naturally high rate of tumor growth. Also, the relationship, if any, between antibody formation and tumor growth is not known (31).

### Epidemiologic Studies of Men

The major reason to doubt the relevance of the animal findings is the extensive evidence from epidemiologic studies showing no greater risk of any serious illness in men with vasectomies than in other men. Since 1978, epidemiologic studies have been conducted on 12 different groups of men, involving in all more than 30,000 vasectomized men and more than 75,000 controls (see Table 1). While some studies followed men for up to 20 years after their vasectomies, most involved men whose vasectomies were less than 10 years earlier. Also, the majority of the vasectomized men were under age 50 at the time of the studies. Thus, these studies could not fully examine the risk of acquiring diseases that take many years to develop or that usually occur in older men. Nevertheless, results to date are reassuring.

All evidence from large human studies indicates that vasectomized men are no more likely to develop atherosclerosis or other circulatory system disease than other men. In one of the largest cohort studies to date, Alexander Walker and colleagues found that vasectomized men in a large group-health practice in the western US were no more likely to be hospitalized for first episodes of heart attack or other diseases of the circulatory system than unvasectomized men in the same practice (521, 526, 527). Among 4,733 men vasectomized between 1963 and 1978, the incidence of hospitalization for nonfatal myocardial infarction (heart attack) was 1.3 per 1,000 man-years. The rate in the control group of about 24,000 age-matched unvasectomized men was 1.2 per 1,000 man-years (527).

### *Few Contraindications to Vasectomy*

Vasectomy is a simple operation that can be routinely performed on an outpatient basis. There are few contraindications. Local skin infections, such as scabies, or genital tract infections can interfere with healing of the incision and should be treated before the operation is performed.

In some situations men should be referred to a specialist, and surgery may have to be performed in a well-equipped hospital. Local conditions that can make the operation difficult or dangerous include varicocele, a large hydrocele, inguinal hernia, filariasis, and scar tissue from previous surgery (118, 263, 268, 449). Some systemic disorders also require special precautions and possibly hospitalization for the procedure, as they would for other minor surgical procedures. These disorders include blood diseases that impede normal clotting, diabetes, and recent coronary heart disease (118, 263).

Occasionally a history of marital, psychological, or sexual instability should be considered a possible contraindication to vasectomy, since these men are more likely to report adverse effects later (94, 231). Also, men should be discouraged from vasectomy if they believe that the procedure will cure sexual dysfunction.

## NICHD Study Shows No Adverse Long-Term Effects from Vasectomy

The largest epidemiologic study to date shows that men who have had vasectomies are no more likely to develop systemic diseases than other men (555). The study, called The Health Status of American Men and sponsored by the National Institute of Child Health and Human Development (NICHD), compared the incidence of 54 diseases in 10,590 vasectomized men and 10,590 matched controls from four cities in the United States. The ages of the men at the time of their vasectomies ranged from 19 to over 60, with a median age of 36. Over 95 percent of the men were followed for 5 years after surgery, and almost 25 percent for more than 10 years.

The study found that vasectomized men had rates of heart disease, cancer, or diseases of the immune system similar to or lower than the rates of unvasectomized men. The rate of heart attack or angina among vasectomized men, for example, was 37 per 10,000 man-years compared with 44 per 10,000 man-years among controls. The rate of cancer was 15 per 10,000 man-years among vasectomized men and 20 per 10,000 man-years among controls. In addition, there were significantly fewer cases of diabetes and fewer deaths during the study period among the vasectomized men.

The only condition that occurred more frequently in vasectomized men was epididymitis (inflammation of the epididymis) and/or orchitis (inflammation of a testis) (see p. D-68). While vasectomized men were more than 2½ times as likely to develop epididymitis/orchitis, the risk was confined mostly to the first year after the operation. Overall, epididymitis/orchitis was rare. Only 278 cases (2.6 percent) were reported among the vasectomized men.

Other studies also report no significant difference (180, 181, 376, 379, 403, 528, 555) (see Table 1).

Moreover, there is no evidence that the risk of cardiovascular disease increases with time after vasectomy (24, 376, 521). In a large US study that has the longest follow-up reported, the relative risk of coronary heart disease in vasectomized men, compared with unvasectomized men, was 1.05 within 5 years after vasectomy and 0.95 more than 25 years after vasectomy. This study involved 1,383 vasectomized men and 3,561 unvasectomized men. The average interval after vasectomy was 15 years (376).

The World Health Organization (WHO) and Family Health International are both planning additional large epidemiologic studies on cardiovascular disease and vasectomy in South Korea (148), China, and India (544). The WHO study in China will investigate 10,000 men whose vasectomies were performed at least 10 years previously and 10,000 age-matched controls. Tests for cardiovascular disease will include electrocardiograms and bicycle stress tests to check for coronary damage (411).

Large epidemiologic studies generally find no increase among vasectomized men in any of the risk factors for cardiovascular disease, such as high blood pressure or alteration in blood clotting (24, 180, 261, 294, 376, 378, 379, 403). In fact, the only adverse effects reported have occurred in very small studies. For example, a recent cross-sectional study of 4,385 vasectomized men and 13,155 age- and race-matched controls found that systolic blood pressure was significantly lower among vasectomized men (378). By contrast, a small study found that 49 vasectomized men had significantly higher blood pressure, on average, than 33 unvasectomized men (552).

High blood pressure or atherosclerotic disease can damage the blood vessels of the retina. A small US study reported that mild retinal changes occurred significantly more often in vasectomized men under age 40 than in unvasectomized men. The frequency of arterial changes was similar in older groups, however (145). A similar study in Denmark found no difference in the prevalence of arteriosclerotic retinal changes in men with and without vasectomy (294).

Alexander and Clarkson hypothesized that sperm antibodies cause the atherosclerosis seen in vasectomized monkeys (20, 101, 102). There is no evidence, however, that antibody formation after vasectomy is involved in the development of cardiovascular disease in men. As part of a large US study on risk factors for coronary heart disease, Edward Perrin and colleagues analyzed the antibody titers of a subsample of 81 vasectomized men with clinical signs of coronary heart disease and 81 vasectomized men without coronary disease. High levels of sperm antibodies were equally common in the two groups. Also, antibody levels were not related to time after vasectomy in either group (376).

Diseases of other organ systems—neurologic, pulmonary, gastrointestinal, and endocrine—are no more common in vasectomized men than in other men. Also, vasectomized men have no excess risk of any type of cancer (179, 379, 525, 555). Several studies suggest, however, that hospitalization for genitourinary conditions or symptoms is slightly more common than in controls in the first year or two after vasectomy and then declines (379, 525, 555). In the large cohort study in the western US, for example, vasectomized men were 1.6 times as likely to be hospitalized for first episodes of genitourinary problems as unvasectomized men. Some of these genitourinary conditions—such as epididymitis—may result from vasectomy. Others, such as benign prostatic hypertrophy (enlargement of the prostate) or phimosis (tightness of the foreskin of the penis), are chronic disorders that may have preceded the vasectomy and been diagnosed only at the time of the procedure (525).

### Hypothetical Immunologic Effects

A large proportion of vasectomized men develop antibodies to sperm (see box, p. D-76). This discovery raised concerns about possible long-term effects of the immune response. Researchers have considered a number of hypothetical problems:

- the production of antibodies to sperm cells might trigger the production of antibodies to other cells,

## Table 1. Selected Recent Epidemiologic Studies of Vasectomy, 1978–1983

| Author, Date & Ref. No. | Place | Study Design & Description of Participants | Disease or Event Studied | Major Findings |
|---|---|---|---|---|
| **Alexander et al. 1981** (24) | US | Cross-sectional. 282 vasectomized men, 614 controls. ½ to 32 years after vasectomy; mean 8.8. | Blood pressure. | –No significant difference in mean systolic or diastolic blood pressures. |
| **Fahrenbach et al. 1980** (145) | US | Cross-sectional. 41 vasectomized men, 112 controls. | Blood pressure, retinal vessel changes. | –No significant difference in mean systolic or diastolic blood pressures.<br>–Significantly higher prevalence of mild retinal vessel changes in vasectomized men age 40 or younger. |
| **Goldacre et al. 1979** (181) | UK | Nonconcurrent cohort. 1,764 vasectomized men, 16,641 matched controls. Mean 4.6 years after vasectomy. | Hospital admissions and first diagnoses of various disease categories.[1] | –No significant difference in rates of cardiovascular disease generally or hypertension or acute myocardial infarction specifically.<br>–No significant difference in admission rates for endocrine, autoimmune, or neoplastic disease.<br>–Admissions for mental disorders lower among vasectomized men. |
| **Goldacre et al. 1983** (180) | UK | Nonconcurrent cohort. Participants same as above. | Hospital admission and first diagnosis of cardiovascular disease. | –No increased risk of cardiovascular disease with vasectomy.<br>–No increase in rate of cardiovascular disease with time after vasectomy. |
| **Goldacre et al. 1983** (180) | UK | Case-control. 1,512 men under age 55 with history of cardiovascular disease, matched with 3,024 controls with other conditions. | Cardiovascular disease. | –2.4% of cases and 2.7% controls had had vasectomy. Risk ratio of 0.9 not statistically significant. |
| **Kisker et al. 1978** (261) | US | Prospective. 58 vasectomized men, 37 matched controls. Mean 1.3 years after vasectomy.[2] | Blood coagulation. | –No significant change in activity of blood clotting factors.<br>–No clinical evidence of thrombosis. |
| **Linnet et al. 1982** (294) | Denmark | Cross-sectional. 46 men 5 years after vasectomy, 46 matched controls. | Retinal vessel changes, blood pressure, circulating immune complexes (CICs). | –No significant difference in prevalence of retinal vessel changes.<br>–No significant difference in mean systolic or diastolic blood pressure.<br>–No significant difference in mean levels or distribution of activity of CICs. |
| **Massey et al. 1983** (555) | US | Cohort. 10,590 vasectomized men, 10,590 matched controls. Median 7.9 years after vasectomy. 2,436 vasectomies performed ≥10 years before. | 54 diseases of major organ systems[3] | –Similar or lower rates of cardiovascular disease, cancer, and diseases of the immune system in vasectomized men.<br>–Diabetes and death significantly less frequent in vasectomized men.<br>–Significant increase in incidence of epididymitis/orchitis in vasectomized men. |
| **Perrin et al. 1984** (376) | US | Case-control. 1,428 men with history of coronary heart disease (CHD), 3,516 men without CHD. Mean 15 years after vasectomy. | Coronary heart disease. | –25% of cases and 29% of controls had had vasectomies. Relative risk of 0.99 not statistically significant.<br>–Incidence of CHD did not vary significantly with time after vasectomy. |
| **Perrin et al. 1984** (376) | US | Case-control. Two groups of vasectomized men, 81 with CHD, 81 without (subsample of above group). | Sperm antibody levels. | –No correlation between high sperm antibody levels and CHD. |
| **Petitti et al. 1982** (378) | US | Cross-sectional cohort. 4,385 vasectomized men, 13,155 matched controls. 377 vasectomies performed ≥ 10 years before. | Blood pressure, blood chemistry measurements. | –No significant difference in mean systolic or diastolic blood pressure.<br>–No significant difference in blood chemistry measurements, white blood cell count, or hematocrit. |
| **Petitti et al. 1982** (379) | US | Cross-sectional cohort. Participants same as above. | Participants' reports of various symptoms of illness and history of disease.[4] | –No significant difference in prevalence of neurologic, pulmonary, or cardiovascular symptoms or disease.<br>–Significantly higher percentage of vasectomized men reported back pain, joint pain or swelling, and kidney or bladder infection. |

(continued)

**Table 1 continued**

| Author, Date & Ref. No. | Place | Study Design & Description of Participants | Disease or Event Studied | Major Findings |
|---|---|---|---|---|
| **Petitti et al. 1983** (377) | US | Nonconcurrent cohort. Participants same as above. | Hospital admissions for various disease groupings.[5] | –No significant differences in incidence of acute myocardial infarction, other ischemic heart diseases, all atherosclerotic diseases, or any other disease group.<br>–No significant difference in rates between men vasectomized ≥ 10 years before and those vasectomized more recently. |
| **Rimm et al. 1983** (403) | US | Case-control. 3,829 men with severe coronary artery occlusion, 3,591 men with less severe coronary artery occlusion. | Coronary artery occlusion. | –No relationship between vasectomy and degree of coronary occlusion.<br>–3.9% of men with severe disease and 6.1% of men with less severe disease had had vasectomies. Risk ratio of 0.6.[2]<br>–No greater risk of severe disease in men vasectomized ≥ 10 years before. |
| **Walker et al. 1981** (525) | US | Nonconcurrent cohort. 6,092 vasectomized men followed for 20,491 man-years. Control group followed for 240,775 man-years. | First hospitalizations for various disease categories and specific illness.[6] | –No significant difference in hospitalization rates for any diseases except those of genitourinary system during early postvasectomy period.<br>–Hospitalization for myocardial infarction slightly lower in vasectomized men; no rise with time since vasectomy.<br>–Hospitalization for mental disorders less frequent among vasectomized men than control group in immediate postvasectomy period. |
| **Walker et al. 1981** (526) | US | Nonconcurrent cohort. 4,830 vasectomized men followed for 24,420 man-years, 24,150 matched controls (subgroups of above). | Diagnosis of myocardial infarction, hypertension, or diabetes. | –No significant difference in rates of myocardial infarction, hypertension, or diabetes. |
| **Walker et al. 1983** (527) | US | Nonconcurrent cohort. 4,733 vasectomized men followed for 33,969 man-years, 23,665 matched controls (subgroups of above). | Diagnosis of myocardial infarction. | –No association of myocardial infarction with vasectomy up to 15 years after procedure. |
| **Wallace 1981** (528) | US | Case-control. 55 men age 50 or less with coronary disease, 55 matched controls. | Coronary disease. | –25.5% of cases and 25.5% of controls had had vasectomies. No association between vasectomy and coronary disease.<br>–No association between vasectomy and any coronary disease risk factors. |

[1]Infective, malignant neoplasms, benign neoplasms, endocrine and metabolic, mental disorders, circulatory, respiratory, digestive, genitourinary, musculoskeletal.
[2]Calculated by Population Information Program
[3]54 selected diseases including diseases associated with immune complexes, autoimmune diseases, cardiovascular diseases including heart attack and angina, cancer, gout, and diabetes. All responses were validated by participants' personal physicians.
[4]Neurologic, pulmonary, cardiovascular, gastrointestinal, genitourinary tract, musculoskeletal, psychological.
[5]Diseases listed in footnote 1, plus neoplasms of unspecified nature; diseases of blood and blood-forming organs, nervous system and sense organs, skin and subcutaneous tissue; symptoms and ill-defined conditions; accidents, poisoning, and violence.
[6]Acute myocardial infarction, benign prostatic hypertrophy, orchitis and epididymitis, redundant prepuce and phimosis and other diseases of male genitals, osteoarthritis, other arthritis, rheumatism, connective tissue disease, internal derangement of joint, disorders of intervertebral disk, vertebrogenic pain, other diseases of joints.

- sperm antigens in the blood stream might combine with antibodies to form circulating immune complexes, which might damage tissue, and
- continuous stimulation of the immune system might lead to immunologic exhaustion and depletion, making an individual more susceptible to illness (30, 409).

To date, however, most evidence suggests that the immune response to vasectomy does not cause disease. With the exception of the increase in sperm antibodies, vasectomized men generally maintain normal functions. Nor is there any evidence from controlled studies that sperm antibodies are involved in any diseases in vasectomized men.

**Antibodies to other cells.** Since sperm possess some structures found in other cells, there has been concern that vasectomy might promote production of antibodies to various cells in the body. This could be harmful, since high levels of circulating antibodies to various cells are associated with a number of clinical conditions, including autoimmune diseases.

To date there is no evidence that vasectomy increases production of antibodies to cells other than sperm. For example, in the largest study to date, Jocelyn Bullock and colleagues found antibodies to various types of cells other than sperm—thyroid, smooth-muscle, and other cells—in 10.5 percent of 904 vasectomized men and in 18 percent of 700 controls. The prevalence of antibodies did not increase with time after vasectomy (86). Most other studies report similar results (68, 111, 112, 215, 219, 418, 422, 511). Other studies show that vasectomized men who form

sperm antibodies are no more likely to develop antibodies to other tissues than vasectomized men who never formed sperm antibodies (68, 111, 219). One study did find a significant increase in the proportion of men with antibodies to thyroid cells after vasectomy compared with before vasectomy (409). Two other studies reported a slight increase in several different types of antibodies (98, 314), but not a very strong immune response like that associated with autoimmune disease. A recent study reports that a larger percentage of vasectomized men than unvasectomized men showed a positive immune response, as measured by an in vitro test, to antigens from various human tumors (32). This suggests that sperm cells and some tumors share common antigens (31, 32). Whether this finding has any clinical significance is unknown.

Studies in the 1970s suggested that vasectomy might lead to the formation of lymphocytotoxic antibodies (antibodies directed at specialized immune cells) in the first year after surgery. Paul Jennings and colleagues found a clear increase in these antibodies in 2 of 32 men soon after vasectomy and a slight increase in 4 (235). By two to four years after surgery, however, the same men exhibited only a very weak response (236). Other studies report a similar decline in these antibodies with time (98) or else no formation of lymphocytotoxic antibodies at all after vasectomy (276, 534).

**Circulating immune complexes.** An antigen and an antibody can combine to form an immune complex. Larger immune complexes are cleared rapidly from circulation by specialized cells, but smaller complexes may circulate longer. Those that are not cleared may lodge in blood vessels or joint spaces, causing inflammation and tissue damage (16, 18, 41, 105, 410).

Despite the continuous release of sperm antigens after vasectomy in some men, there is no evidence that vasectomized men develop and maintain high levels of circulating immune complexes (554). Several studies report that in some men levels of circulating immune complexes rise and then decline and disappear (213, 418). According to other reports, excess circulating immune complexes are either not detected at all in the first two years after vasectomy or are found in very low concentrations (47, 215, 409). One retrospective cohort study found a higher prevalence of circulating immune complexes in 160 vasectomized men than in 59 controls, but the difference was not statistically significant (513). In a small study of vasectomized rabbits, the buildup of circulating immune complexes in the seminiferous tubules of the testes and in the glomeruli of the kidney, although not directly observed, has been blamed for orchitis and mild glomerulonephritis (inflammation of capillaries in the kidney) (76). Immune complexes also have been observed in preliminary studies of vasectomized monkeys (25).

Thus the incidence of circulating immune complexes before and after vasectomy is not clearly understood. Furthermore, methods for detecting circulating immune complexes and for identifying immune complex-mediated disease are not precise (201, 409, 554). Several different tests can be used and may produce different results when used on the same individual (213, 513).

**Immunologic exhaustion.** A third hypothetical effect of vasectomy is the development of immunologic exhaustion, or immunosuppression. According to Deborah Anderson and Nancy Alexander, large quantities of antigens and high levels of circulating immune complexes may cause a generalized breakdown of the immune system, making an individual highly susceptible to infection or cancer (30). Preliminary studies suggest significantly less cellular immune response than normal in monkeys vasectomized 11 years previously, whereas immune responses in monkeys vasectomized 7 years previously were normal (549). Such findings have not been reported in other animals or in men, however (30, 285).

Although preliminary data are reassuring, the long-term effect of vasectomy on immunologically mediated diseases is not known yet. Since these diseases are rare, as many as 10,000 to 20,000 vasectomized men and an equal number of controls should be followed for 10 to 15 years to obtain conclusive results (484). Only one such study has been reported (see box, p. D-72). Although not large enough to be conclusive, another US study found that vasectomized men experienced back trouble and pain or swelling in the joints slightly but significantly more often than unvasectomized men. These findings may be important, since diseases of the joints and connective tissue such as rheumatoid arthritis and scleroderma have been linked with an autoimmune response (379). Other epidemiologic studies, however, report no statistically significant differences in the rates of arthritis, diseases of the connective tissue, and diseases of the musculoskeletal


**Prepared by the Family Planning Organization of the Philippines, a comic book in the Cebuano language frankly answers men's questions about vasectomy:**

*Question:* Vasectomy? Isn't it dangerous?
*Answer:* ...If that were true, I wouldn't have suggested it.
*Question:* I heard from someone that they cut your organ.
*Answer:* That's not true. What is cut are those tubes through which semen pass....Vasectomy is an easy operation....
*Question:* Won't it affect our virility?
*Answer:* If we're talking about bad effects, there are none. In fact, vasectomy will even add to your virility because you can now sleep with your wife more often. But...after vasectomy a man should ejaculate at least 20 times to be sure that there are no more sperm left in his body. In the meantime...use other methods such as the condom.
*Question:* Do you mean that nothing comes out after vasectomy?
*Answer:* There is still something that comes out but none of the sperm that can make the woman pregnant.

# Immune Response After Vasectomy

A major scientific question concerning vasectomy involves sperm antibodies. Vasectomized men are much more likely to develop sperm antibodies than other men. These antibodies, molecules that circulate in the blood, are a response by the body's immune system. They inhibit sperm activity in various ways. There is no evidence that they cause any harmful effects or increase the risk of illness. Nevertheless, speculation continues about their potential role, if any. Sperm antibodies may reduce fertility if vasectomy reversal is tried, but data are not conclusive (see p. D-81).

Most fertile men do not develop sperm antibodies. Sperm are usually isolated from the immune system by cell barriers. If these barriers break down, sperm leak into surrounding tissues. Then antigens, substances in sperm, trigger the formation of antibodies. This immune response to sperm occurs because the immune system learns to differentiate between the body's own tissue and other proteins very early in life; since sperm are not produced until puberty, the body regards them as "foreign" (18, 41, 285, 302).

After vasectomy, sperm antigens may leak into the blood stream in several ways, including ruptures in the vas at the site of the operation or in the epididymis; absorption by macrophages (special cells that ingest foreign substances), or increased permeability of the cell barriers (18, 30, 153, 285, 302, 410). Sperm antibodies also occur in about 2 to 8 percent of unvasectomized men (35, 68, 212, 215, 244, 333), often because of vasal obstruction, surgery, infection, or congenital abnormalities (41, 421).

### Humoral and Cell-Mediated Responses

In general, there are two types of immunologic reactions: humoral and cell-mediated. The humoral response involves antibodies, which develop 5 to 10 days after the introduction of a foreign substance in the body. By contrast, cell-mediated immunity is an immediate or delayed sensitivity involving specialized cells called T-lymphocytes, which migrate to and participate in a reaction against antigens.

After vasectomy the most common antibodies are sperm-agglutinating and sperm-immobilizing antibodies. Sperm-agglutinating antibodies, which cause sperm to clump together, develop in 40 to 70 percent of men in the first year after surgery (33, 35, 68, 196, 212, 215, 292, 333, 409, 422, 451). These antibodies usually appear in the first six weeks to six months after surgery (68, 212, 292, 302, 422, 454), although some have been found as early as 10 days after vasectomy (212). The percentage of vasectomized men with spermagglutinating antibodies may increase for two to three years after vasectomy (215, 333, 409) and then remain stable (34, 213).

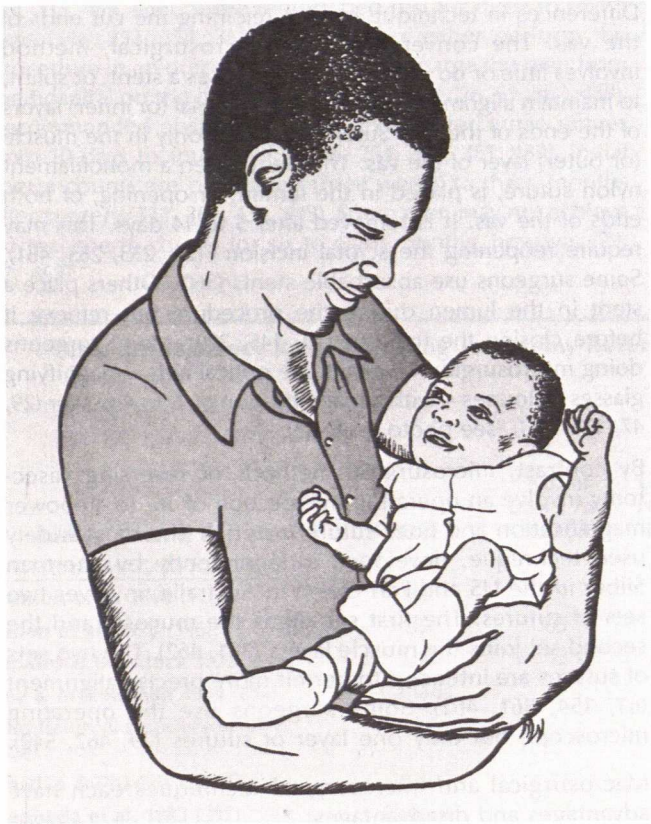
Sperm-immobilizing antibodies are less common, occurring in fewer than 3 percent of unvasectomized men and in about 25 to 60 percent of vasectomized men by one year after surgery (33, 35, 68, 212, 333, 409). Sperm-immobilizing antibodies rarely develop unless sperm-agglutinating antibodies also are present (30, 213, 409). In various studies the percentage of vasectomized men with sperm-immobilizing antibodies peaked at 12 months after vasectomy and then either remained the same (276, 333) or declined (34, 35).

Antibodies to protamine, an antigen in the nucleus of sperm, have been detected in 22 to 39 percent of vasectomized men. In unvasectomized men protamine antibodies are extremely rare. After vasectomy they occur only in men with other antibodies (212, 409, 422, 423, 512). Protamine and DNA are the main components of the sperm nucleus. Thus, researchers theorize, if antibodies to protamine develop, antibodies to DNA might also develop. Because DNA is found in all cells in the body, this would cause concern (423). To date, however, all evidence indicates that protamine antibodies affect only sperm, and no antibodies to DNA have been detected in vasectomized men (420, 422).

It is not clear why some men develop high antibody levels after vasectomy while others do not. A number of factors have been studied, including age at the time of vasectomy (21, 196, 276, 409), prevasectomy sperm count (21, 212, 292), method of vasectomy (23), granuloma formation (22, 292, 420), and hormone and blood chemistry measurements (21). None of these factors were consistently linked with sperm antibodies. According to one report, men who developed sperm antibodies had significantly lower levels of follicle-stimulating hormone (FSH) both before and after vasectomy than men who did not develop sperm antibodies (21). Animal studies find varied immune responses in different strains of the same species, suggesting a genetic influence (75, 270, 502). Possibly genetic differences determine the human immune response as well (17). Immunologic responses also differ widely among species of animals (30, 73, 421, 444), but antibodies to sperm develop in 50 to 100 percent of all animals studied (73).

Many vasectomized men form only very low concentrations of antibodies. Among 194 vasectomized men, for example, 60 percent developed some sperm-agglutinating antibodies in the first postoperative year, but only 37 percent had high serum levels. Similarly, 38 percent developed sperm-immobilizing antibodies, and fewer than one-third of these showed a strong response (409). Moreover, reports of the incidence of antibodies vary widely. A number of different tests are used to detect serum antibodies, and none is precise (73, 276, 333, 483, 511, 512).

Cell-mediated immunity after vasectomy appears to be rare. Only a few small laboratory studies have examined cell-mediated immunity in vasectomized men (68, 209, 215, 234, 331, 333, 342). While laboratory techniques are not precise and study results are inconsistent, most evidence suggests that vasectomy does not trigger a cellular immune response in man. Cell-mediated immunity has been reported in vasectomized laboratory animals, however (18, 73, 81).



**Le père est responsable de la planification de la famille**

**"Fathers are responsible for family planning." Over 5,000 copies of this poster have been distributed in Zaire by the Rural Primary Health Care Project. Despite efforts to increase male involvement in family planning, vasectomy is very rare in all of Africa.**

system among vasectomized and unvasectomized men (179, 525, 555).

### Effects on Hormone Production and Reproductive Organs

Vasectomy causes no serious long-term changes in either testicular function or in hormone production. Vasectomy does not alter the production of pituitary gonadotrophic hormones (FSH and LH) or of testosterone (129, 177, 242, 266, 344, 353, 388, 471, 475, 514, 519, 532, 533, 558). Hormone profiles in men vasectomized up to six years previously are normal. The number and function of the Leydig cells, which produce testosterone in the testes, also are normal after vasectomy (195).

Although a few reports of morphological changes in Leydig cells in vasectomized animals have caused concern (401), in men vasectomy appears to cause no important long-term changes in the testes and accessory sex organs (30, 74, 245, 295). Studies up to one year after vasectomy report that the size of the testes remains the same (132, 195). Not long after vasectomy normal spermatogenesis resumes, and testicular biopsies up to 17 years after vasectomy show continued sperm production (106, 127, 195). (It is not known whether any disturbance of spermatogenesis occurs at the light-microscopic level, however.) Sperm that are not resorbed rapidly enough may build up in the epididymal ducts, causing pressure, pressure atrophy distention, and sometimes rupture (218, 370, 457) (see p. D-70). Resulting granulomas and obstructions may interfere with sperm transport into the vas after vasectomy reversal (see p. D-80). After vasectomy, prostate gland and epididymal secretions decrease (245, 343, 448), reducing the volume of semen slightly in some men (246, 343). Studies on men one to two years after vasectomy show no change in the seminal vesicles (504).

Most studies show that vasectomy does not affect sexual satisfaction and sexual functioning. In the largest US cohort study of over 21,000 men, for example, the incidence of impotence was the same in vasectomized and unvasectomized men—1.9 per 1,000 man-years compared with 1.7 per 1,000 man-years (555). In one small group of 42 patients over age 50 seeking treatment for impotence in California, a higher than expected percentage of vasectomized men was found (6, 269). The impotence was due to organic, not psychological, problems in about 90 percent of the men. Many of these men, however, were suffering from chronic illnesses and were taking medication, either of which could have affected their ability to sustain an erection (6, 269).

### Psychological Effects

Studies on the long-term effects of vasectomy provide no evidence of adverse psychological effects (181, 377, 525). Worldwide, the great majority of vasectomized men surveyed report that they have no regrets and would recommend the operation to others. Vasectomized men and their wives usually report either no change or improvement in marital happiness and in sexual satisfaction (15, 104, 184, 231, 313, 407, 419, 426, 469).

In general, retrospective studies have reported psychological problems in less than one to 5 percent of vasectomized men. These men have reported decreased libido, general worsening of health, and depression, among other complaints (13, 55, 90, 175, 176, 183, 230, 279, 326, 374, 428, 469, 533). Psychological problems are reported to be more common in Asian countries, particularly in India, where 15 to 30 percent of vasectomized men complain of deteriorating health, and 20 percent or more complain of adverse sexual effects (27, 36, 71, 200, 247, 274, 330, 395, 429, 446, 496, 537, 538, 542). Other problems reported in Asia include insomnia, nervousness, headache, uneasiness, depression, and weight loss (36, 395, 446, 538).

Most psychological studies, however, have not involved control groups, and these complaints reported after vasectomy may be common to the male population generally. In Bangladesh, for example, Atiqur Rahman Khan and colleagues found that the most frequent compliants, reported by 45 percent of vasectomized men, were nonspecific problems—"a decreased ability to work" and "weaknesses." When matched, unvasectomized men of similar age and family size from the same village were interviewed, 58 percent said that their ability to work had decreased over the past year. Some 55 percent said that they had become sexually weaker (258). Age also may be related to complaints such as these; men over age 40 are more likely to complain of weakness (90) or decreased sexual desire (71, 395).

Psychological reactions may be influenced by the circumstances under which the procedure takes place. G.D. Shukla and colleagues reported that the severity of symptoms among Indian men complaining of weakness was directly related to the degree of coercion used to persuade the men to undergo vasectomy (450). Psychological complaints also have been attributed to improper moti-

vation and advice, irregular follow-up, and failure to provide promised payments (258, 522).

Postoperative psychological reactions can often be attributed to men's preoperative attitudes and conditions. Problems may be reduced if a history of serious marital, psychological, or sexual instability is considered a possible contraindication to vasectomy, and if careful preoperative counseling takes place (94, 407, 497).

## VASECTOMY REVERSAL

Inevitably some men will regret their choice of vasectomy. Experienced surgeons have reported restoring fertility in an average of only 50 percent of cases, however, and success rates for less experienced surgeons are probably lower. Thus, vasectomy should be considered a permanent procedure.

The worldwide demand for vasectomy reversal is unknown. In the US an estimated 2 in 1,000 vasectomized men request reversal (29); in South Korea, one in 1,000 (281); in certain rural and urban areas of India, 2 to 3 per 1,000 (481, 482). By comparison, in a survey of US women who had been sterilized, almost 3 percent said they wanted reversal (492). In an Indian survey, however, women were less interested than men in reversal of sterilization (364). (See **Population Reports,** *Reversing Female Sterilization,* C-8, September 1980.) Demand for vasectomy reversal might be higher if more men were aware that in some cases vasectomies can be reversed (481).

Reasons that men seek reversals include:

- remarriage after divorce (the major reason in developed countries) (29, 126, 146, 233, 283, 481);
- death of one or more children, especially a male (the major reason in developing countries) (146, 283, 364, 482);
- desire for more children, often following improvements in the family's finances (283, 364, 369);
- psychological problems with infertility or, rarely, chronic physical problems due to vasectomy (together accounting for less than 10 percent of requests) (146, 196, 283, 364).

Women are more likely than men to blame sterilization for physical or emotional ill health (214).

### Methods

Reversal of vasectomy, unlike the original operation, must be performed by highly trained and experienced surgeons in a fully equipped hospital. The reversal procedure takes 1¼ to 3 hours.

In general, the surgeon begins by removing the scarred ends of the vas where they were originally cut, along with any granulomas. He or she then checks that the vas is open and determines whether there are sperm in the fluid in the testicular side of the vas. If there is no fluid or if the fluid contains very few sperm or only abnormal sperm, the surgeon may remove more of the vas and the epididymis until sperm are observed. When the epididymis is blocked, the surgeon may join the vas directly to the epididymis past the obstruction (29, 59, 61, 154, 439, 457, 461, 463, 481).

Differences in technique involve rejoining the cut ends of the vas. The conventional, or macrosurgical, method involves little or no magnification and uses a stent, or splint, to maintain alignment between the mucosal (or inner) layers of the ends of the vas. Sutures are used only in the muscle (or outer) layer of the vas. The stent, often a monofilament nylon suture, is placed in the lumen, or opening, of both ends of the vas. It is removed after 5 to 14 days. This may require reopening the scrotal incision (126, 233, 283, 481). Some surgeons use absorbable stents (360). Others place a stent in the lumen during the procedure but remove it before closing the incision (29, 146, 320). Many surgeons doing macrosurgical reversals use optical aids—magnifying glasses or loupes—with a magnification of 2- to 4-power (29, 47, 126, 283) (see photo, p. D-82).

By contrast, microsurgical methods of reversing vasectomy involve an operating microscope of 16- to 40-power magnification and finer suture material. The most widely used technique, developed independently by Sherman Silber in the US and Earl Owen in Australia, involves two sets of sutures. The first set aligns the mucosa, and the second set joins the muscle layers (361, 462). The two sets of sutures are intended to permit more precise alignment (61, 154, 361, 462). Some surgeons use the operating microscope but only one layer of sutures (29, 462, 540).

Macrosurgical and microsurgical techniques each have advantages and disadvantages:

| Macrosurgical | Microsurgical |
|---|---|
| Reported pregnancy rates as high as 85 percent, with most ranging from 35 to 65 percent (see Table 2). | Reported pregnancy rates as high as 79 percent, with most ranging from 45 to 75 percent (see Table 2). |
| Less precise rejoining of vas may allow more sperm leakage and obstruction, lowering sperm counts (59, 154, 283, 467). | More precise alignment of mucosa possible. |
| Stent may damage lining of vas (283, 501). | Permits exploration of convoluted portion of vas and epididymis to find sperm in fluid (61, 154, 283, 461, 463). |
| Stent leaves opening in vas through which bacteria may enter and sperm flow out (29, 360, 416, 439). | Makes easier the joining of vas and epididymis, if necessary (61, 154, 284, 461, 463). |
| Takes about half as long as microsurgery, so less anesthesia and lower cost (154). | Requires extensive training—about 40 hours—and frequent practice (60, 62, 126, 154, 362, 440). |
| Uses standard surgical equipment. | Microscope expensive and difficult to maintain. |

Magnifying loupes offer some of the benefits of the microscope without the high price. Loupes with 2- to 4-power magnification cost as little as $22 in the US (472). More expensive loupes cost $500 or more (348). After reversal surgery performed with loupes, patency rates (measured by the presence of sperm in the ejaculate) are very high, ranging from 74 to 100 percent. Reported pregnancy rates of 19 to 64 percent are similar to rates for macrosurgery (see Table 2).

Vasectomy reversal, like vasectomy, has few side effects. Aside from some discomfort after surgery, fewer than 10 percent of men experience any medical problems. Hematoma and effects of anesthesia are the most common (146, 307, 397).

Recommendations for postoperative care vary. Most physicians recommend a scrotal support for two to four weeks

(61, 233, 439, 449). Some require bed rest for three to seven days (146, 233, 254, 361), while others either perform the procedure in an outpatient clinic or discharge the man from the hospital on the day after the procedure (26, 61, 307, 439). Recommended abstinence from sexual intercourse ranges from 10 days to four weeks (146, 254, 307, 361, 439). Initial sperm counts are performed three weeks to three months after surgery (311, 361, 439, 449). Some men may not achieve normal sperm counts for six to eight months, however (29, 47, 462).

## Effectiveness

In recent reports reversals have restored patency—that is, sperm have been found in the ejaculate—in 67 to 100 percent of men. Functional success—that is, pregnancies among the wives of men who have had reversals—has ranged from 16 to 85 percent (see Table 2). Pregnancy rates depend on:

- anatomical and physiological effects of the original vasectomy,

**Table 2. Pregnancy Rates Following Vasectomy Reversal, by Magnification Used, Selected Studies, 1967–1983**

| Author, Date, & Ref. No. | Place | No. of Cases Followed | Length of Follow-up in Years | Stent? | Magnification | Years Between Vasectomy & Reversal (Mean in Parentheses) | % With Sperm in Ejaculate After Reversal | Pregnancy Rate (%) |
|---|---|---|---|---|---|---|---|---|
| **WITHOUT MAGNIFICATION** | | | | | | | | |
| **Denton et al. 1983** (126) | US | 29 | >1 | Yes | — | 1–20[a] (6) | 96[a] | 66 |
| **Fallon et al. 1978** (146) | US | 35 | >1 | [b] | — | <20 (6) | 83 | 40 |
| **Jenkins & Blacklock 1979** (233) | UK | 13 | ≥1.5 | Yes | — | 0.6–10 (3.9) | 100 | 85 |
| **Lee & McLoughlin 1980** (284) | Canada | 41 | >1 | Yes | — | 0.5–15[c] (5) | 90 | 46 |
| **Middleton & Henderson 1978** (320) | US | 72 | NA | No | — | NA | 94 | 39 |
| **Phadke & Phadke 1967** (380) | India | 73 | ≥1 | Yes | — | 1–16 | 86 | 58 |
| **Requeda et al. 1983** (397) | Canada | 7 | 1 | NA | — | 1–11[d] | 81[d] | 46[e] |
| **Ro' 'nd et al. 1977** (416) | US | 21 | >1 | Yes | — | 1.7–12.1 (6.9) | 67[f] | 29 |
| | | 14 | | Yes[g] | — | 1–8.6 (4.8) | 86[f] | 29[h] |
| **Schmidt 1975** (439) | US | 64 | 4 | [i] | — | NA | 78 | 31 |
| **WITH MAGNIFYING LOUPE** | | | | | | | | |
| **Amelar & Dubin 1979** (29) | US | 119 | >2 | No | 4× | NA | 85 | 38 |
| **Bagshaw et al. 1980** (47) | UK | 56 | ≥0.5 | [j] | 4× | <10 | 91 | 25 |
| **Denton et al. 1983** (126) | US | 18 | >1 | No | 2.5× | 1–20[a] (6) | 96[a] | 61 |
| **Fallon et al. 1981** (147) | US | 27/28[k] | ≥1.5 | No | 2.5× | NA | 74 | 57 |
| **Fitzpatrick 1978** (158) | US | 14 | 0.5 | No | NA | NA | 100 | 64 |
| **Kessler & Freiha 1981** (255) | US | 83/71[l] | NA | No | 4× | ≤20 | 92 | 45 |
| **Lee & MVSP 1980** (283) | South Korea | 78 | <1 | Yes | 2× | 1–16 | 79 | 19 |
| | | 222 | | | 4–6× | | 86 | 41 |
| | | 300[m] | | | 2–6×[m] | | 84[m] | 35[m] |
| **WITH MICROSCOPE** | | | | | | | | |
| **Ferreira 1981** (155) | Brazil | 21 | 1 | No | NA | 0–14 | 85[n] | 71 |
| **Gojaseni & Visuthikosol 1979** (178) | Thailand | 8 | NA | No | 16× | 2–15 | 75 | NA |
| **Kaye et al. 1983** (251) | US | 25[o] | ≥.25[p] | No | NA | 1.25–15 (5) | 96 | NA |
| **Lee & McLoughlin 1980** (284) | Canada | 26 | ≥1 | No | NA | 0.5–15[c] (5) | 96 | 54 |
| **Martin 1981** (311) | US | 21 | ≥1 | No | 5–25× | 1–19 (7.4) | 90 | 43 |
| **Owen 1977** (361) | Australia | 50 | 1.5 | Yes[q] | NA | <9 | 98 | 72 |
| **Owen & Kapila 1981** (362) | Australia | 400 | ≥2 | No | 25× | NA | 96[r] | 79 |
| **Requeda et al. 1983** (397) | Canada | 40 | >1 | NA | NA | 1–11[d] | 81[d] | 46[e] |
| **Schmidt 1975** (439) | US | 44 | 1.5 | NA | 16× | NA | 82 | 16 |
| **Silber 1979** (466) | US | 42 | 1.5 | No | 16–25× | NA | NA | 71 |
| **Willscher & Novicki 1980** (540) | US | 12/10[s] | 0.25–1.33 | No | 20× or greater | 1.5–9 | 83 | 60 |

[a]Rate for 54 cases (both with and without magnification) for which semen analysis was performed
[b]Stents used on patients 1968-71; no stents used 1972-75.
[c]For 87 cases; 67 followed up, 26 with and 41 without magnification.
[d]Based on 47 cases, 40 with and 7 without magnification.
[e]Based on follow-up of 39 of 47 patients requesting reversal in an attempt to recover their fertility
[f]Sperm count >10 million per cubic cm
[g]Absorbable splint of catgut left in place
[h]8 patients followed up for less than one year
[i]Various techniques used, both with and without stent
[j]Nylon stent used only if reversal technically difficult
[k]27 patients had postoperative semen analysis; pregnancy information available for 28 couples.
[l]83 patients had postoperative semen analysis; pregnancy information available for 71 patients.
[m]Above two groups combined
[n]Sperm count >20 million per cubic cm
[o]Procedures done on outpatient basis under local anesthesia
[p]4 patients followed up for less than three months
[q]Stent removed during procedure
[r]Sperm present in "significant numbers"
[s]12 patients had postoperative sperm analysis; pregnancy rate determined from 10 cases eligible (wife fertile).

Since 1950 researchers have sought effective and acceptable new methods of male contraception to add to vasectomy and condoms. The goal of a "male pill" remains elusive. Recent research has focused on four possibilities:

- gossypol,
- LHRH analogues,
- long-acting steroids,
- inhibin.

To date none of these potential methods has reached the stage of large clinical trials (385).

### Gossypol

Gossypol, a chemical derived from the cotton plant, is the most widely tested possibility for a male pill (381). Research on gossypol as a contraceptive began in China in 1971 following the discovery that low fertility among cottonfield workers was due to cooking with unrefined cottonseed oil (347). Gossypol alters sperm metabolism, either killing or immobilizing sperm cells (248, 315, 507, 549). Unlike steroids, gossypol does not seem to work by affecting the pituitary or hypothalamus (50).

Clinical trials involving over 8,800 men in China found that gossypol reduced sperm counts below four million per ml of semen in 99 percent of users within two to three months (297). About 5 to 15 percent of the men experienced minor side effects, including fatigue, gastrointestinal upsets, dizziness, and dryness of the mouth. Five percent reported decreased libido and potency. Less than one percent developed hypokalemia, a severe potassium deficiency that can be life-threatening (297). This side effect occurred only where potassium intake is well below recommended daily levels (381, 389). Administering potassium salts to men who complain of fatigue and weakness might prevent hypokalemia (296, 389).

It is not clear whether the contraceptive effect of gossypol is reversible. Among 2,067 men followed up at the end of treatment, only 75 percent achieved sperm counts of over 4 million per ml. Ten percent remained azoospermic. In some cases counts did not increase within three years after discontinuation. Normal sperm counts returned more frequently in men who had taken gossypol for two years or less (296, 297).

Research on gossypol continues. In China a randomized double-blind trial comparing men taking either gossypol or a placebo is under way (304). The World Health Organization (WHO) and the US National Institute for Child Health and Human Development (NICHD) are collaborating to develop a standard preparation of pure gossypol acetic acid and to perfect methods for analyzing purity and stability. WHO also is starting a program in 10 countries to synthesize analogues of gossypol and related compounds in hopes of finding one as effective as gossypol itself but less toxic (544).

### LHRH Analogues

Another approach to male contraception uses chemical analogues of luteinizing-hormone releasing hormone (LHRH). These analogues interfere with the action of LHRH, a peptide synthesized in the hypothalamus that stimulates the release by the pituitary of follicle-stimulating hormone (FSH) and luteinizing hormone (LH). These hormones, in turn, trigger the production of testosterone and other steroids that are essential for sperm production.

Over 1,000 analogues of LHRH have been developed, including some more than 100 times as potent as the natural hormone (211). Those being studied are either agonists, which mimic the activity of LHRH, or antagonists, which block the effect of LHRH (64, 424, 430).

To date LHRH analogues have been tested in only a few men. Most studies in men have involved agonists, which cause, after a brief initial increase in FSH and LH, as much as a 40 to 50 percent drop in hormone levels (58, 67, 151, 152, 290, 391, 476, 536). None has completely stopped sperm production, however. For example, among eight men receiving 50 μg injections of the agonist $LHRH_A$ (D-$Trp^6$-$Pro^9$-N-ethylamide-LHRH) daily for 6 to 10 weeks, only one became azoospermic, and

- the reversal technique and the skill of the surgeon,
- the fertility of the men's wives.

**Effects of the vasectomy.** Granulomas *in the epididymis* may block sperm from entering the vas after reversal (see p. D-70). These granulomas occur in as many as half of all vasectomized men. They become more common with time since vasectomy (47, 63, 126, 255, 283, 466). Thus the longer the period since vasectomy, the smaller the chances of successful reversal (126, 283, 466). For example, Silber followed 121 men undergoing reversal. All of the men undergoing reversals within two years of their vasectomies eventually had normal sperm counts. Among the men who had vasectomies less than 10 years before reversal, 91 percent achieved a normal sperm count. Among men whose vasectomies were more than 10 years earlier, the rate was 35 percent (466).

Silber has advocated leaving the cut testicular end of the vas open after vasectomy to improve chances for successful reversal later (463). This allows sperm to escape, leading to granuloma formation *at the vasectomy site*. Other clinicians disagree, since such granulomas may increase the likelihood of recanalization and unwanted pregnancy (56, 63). Also, some men experience pain from sperm granulomas and require surgery (56, 130, 491).

Removing more than 2.5 cm of the vas may create technical problems during reversal surgery (47, 307). Sometimes a large portion of the vas was removed during the original procedure. At other times the original procedure—for example, doubling back and ligating the vas onto itself—creates extensive scar tissue that must be removed (223). During reversal, tension on the short rejoined portions of the vas may make them separate (203, 223, 438). Also, vasectomies done in the convoluted section of the vas near the testis make reversal surgery more difficult. A larger scrotal incision is necessary (458).

two others maintained sperm counts of about 25 million per ml. With the fall in testosterone levels, five men became impotent. All effects reversed several weeks after discontinuation (290, 391).

It is unlikely that LHRH analogues will come into use in the next decade. First, the best analogue and the most appropriate dose have not yet been established. Second, men must receive exogenous testosterone along with the analogue to prevent impotence and loss of libido (50, 163, 487). Third, the best delivery system has not been chosen. LHRH analogues and testosterone are not active orally. Injections and nasal sprays are possible but may not provide the constant blood levels necessary. Other possibilities being studied include biodegradable and nonbiodegradable capsules that can be implanted under the skin and biodegradable microcapsules that can be injected intramuscularly (372, 430).

### Long-Acting Steroid Hormones

Some male and female hormones can prevent sperm production by suppressing the production of FSH and LH. To date about 15 hormones have been studied in men, including testosterone, testosterone enanthate, testosterone cypionate, depot medroxyprogesterone acetate (DMPA), norethindrone, and estradiol (49, 50, 124, 301, 373, 387, 474, 486) (see **Population Reports,** *Long-Acting Progestins—Promise and Prospects,* K-2, May 1983). None of these, administered either alone or in combinations, has completely stopped sperm production, and even men with very low sperm counts—less than 10 million per ml—can be fertile (54).

Researchers have focused mainly on combinations of an androgen and a progestin, since either type of hormone alone produces unacceptable side effects (49, 50, 82, 124, 373, 474). These hormones are usually administered by injection. To date, the most promising combination is DMPA and an androgen (124, 373). WHO plans a pharmacokinetic study of DMPA and testosterone enanthate and also a study of the effects, if any, on levels of high-density lipoprotein cholesterol, which are thought to affect the risk of circulatory system disease (544). In other studies with various regimens of DMPA and testosterone esters, sperm counts dropped to less than one million sperm per ml in more than 75 percent of men. Some of the men stopped producing sperm entirely (28, 83, 150, 170, 282, 319). Another combination—testosterone and the estrogen estradiol—has shown promise in monkeys. Administered through subcutaneous implants, the hormones produced complete and reversible sterility with no side effects on blood chemistry or hematology (143, 144, 301). Also being studied is a salve that can be rubbed on the chest and abdomen, so that the hormones are absorbed through the skin (485).

### Inhibin

Research on other methods of male contraception is still very preliminary. For several decades scientists have been studying the hormone inhibin, a peptide found in the gonads. Research in animals suggests that inhibin suppresses the release of FSH from the pituitary and thus could prevent sperm production. Inhibin does not seem to reduce release of LH, however, and so should not affect the production of testosterone. Currently, there is no evidence whether inhibin will prevent sperm production in humans, and the hormone has not been isolated or purified (50, 350, 352, 373). US AID is supporting a collaborative project to isolate inhibin in pigs and rams (447).

Other possible avenues of research include new long-acting steroids and immunization against FSH (352, 535). A number of other pharmacologic agents reduce fertility either by affecting the testes or accessory glands or by immobilizing sperm in the epididymis. In general, however, these agents are too toxic (117, 216, 300, 352, 535). In sum, effective, inexpensive, and acceptable chemical contraception for men is still very much in the future. According to the European Medical Research Council Advisory Subgroup on Human Reproduction, more basic research in the physiology and pathology of male reproduction is needed before new male methods can be developed (352).

A reversal procedure may fail if the ends of the vas are not precisely aligned when they are rejoined (462, 468). Since the opening in the vas is less than one mm in diameter (441), alignment is difficult. Furthermore, after vasectomy, accumulating spermatic fluid may swell the testicular end of the vas by as much as 70 percent (441), so the ends being rejoined are no longer the same size. Misalignment, in addition to blocking the path for sperm, may allow sperm to leak, causing granulomas and scars that can block the vas (199). Thus in some men sperm counts are high soon after reversal but decline or even drop to zero in a few months (47, 283, 309, 311, 362, 468).

Sometimes the original vasectomy procedure permanently damages nerves in the sheath of the vas. These nerves control the rhythmic contractions of the vas associated with ejaculation (521). If these nerves do not function, contractions will not take place on the testicular side of the damage. Then sperm in the epididymis, which account for about two-thirds of the sperm in a normal ejaculate, cannot be expelled (168, 363). (The ability to ejaculate is not affected, however.) While controlled studies have not been conducted, researchers think that the nerves may be less likely to regenerate under several conditions: if a large portion of the vas is removed, if a suture or clip at the stump of the vas is too close to the sheath, if an inflammatory reaction occurs, or if scar tissue forms (29).

Recent and still inconclusive evidence suggests that sperm antibodies reduce fertility after vasectomy reversal, even though the sperm count may be normal. With one exception (505), several small studies have found that men with high levels of sperm antibodies in the blood serum achieved fewer pregnancies than men with low levels or no antibodies (47, 174, 293, 397, 417, 495). The only such study to account for other possible influences on fertility analyzed 15 men who were similar with respect to sperm counts, sperm mobility, age, and time since vasectomy.

After reversals all eight who were fertile had low serum levels of antibodies; six of the seven who were infertile had high levels.

Sperm antibodies also are found in semen. Sperm antibodies in semen are more common after reversal than before (293) and are more common in men with antibodies in serum than in those without (291). In the study of 15 men, only one of the eight fertile men had antibodies in semen, compared with four of the seven infertile men (397).

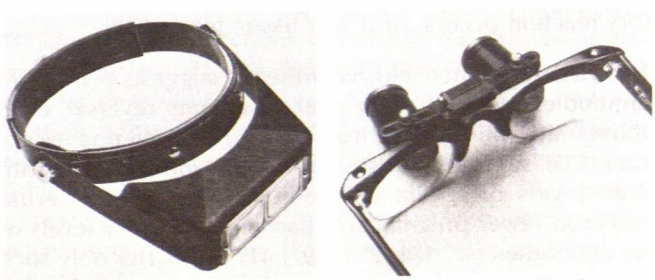
There are conflicting reports on whether antibodies in semen or serum affect sperm mobility (172, 196, 293, 397, 495). Some researchers report that sperm antibodies in semen may lower fertility by coating the surface of sperm cells, preventing them from penetrating cervical mucus (19, 159, 272, 418), or by making them incapable of fertilization (17, 397).

Do high antibody levels in a vasectomized man necessarily mean that a reversal would be pointless? Most researchers think not (29, 293, 307, 417). After reversals, antibody levels fall in some men and rise in others, and the changes are unpredictable (29, 417). Measuring antibodies before and after reversal may help with counseling (293), but treatment for infertility associated with sperm antibodies succeeds only in about one-third of couples (332, 417, 452, 453).

**The reversal technique.** It is not clear which method of vasectomy reversal is most successful. Microsurgery has yielded the highest reported pregnancy rates, but, overall, rates are similar for all methods (see Table 2). No controlled studies have compared different techniques.

In one institution a comparison of 41 single-layer macrosurgical reversal procedures and 26 two-layer microsurgical reversals found sperm in the ejaculates of 90 and 96 percent of the men in the two groups, and pregnancies achieved by 46 and 54 percent. The difference in pregnancy rates is not statistically significant (284).

Gauging the effectiveness of reversal methods is difficult. Reported success rates may depend chiefly on the experience and skill of the surgeon, the selection of clients, and the length of follow-up. For example, up to 45 percent of pregnancies may occur more than a year after reversal (126, 283, 466). Thus studies with a short follow-up may report misleadingly low pregnancy rates. Also, surgeons with low success rates may be reluctant to publish their results.



**Optical loupes such as these, with 2- to 4-power magnification, are used by some surgeons when performing vasectomy reversals.** (Courtesy of Keeler Instruments and Donegan Optical Company)

**Wife's fertility.** When a couple is unable to achieve a pregnancy after vasectomy reversal, the question of the wife's fertility should not be forgotten. Where vasectomy reversal follows a remarriage, the new wife may have had no children, so her fertility is unknown. A small British study found that, among men with normal sperm counts, reversals appeared to be more successful in men who stayed with their original partners than in men who had remarried. Time since vasectomy was less among the former, however, which may have influenced pregnancy rates (47).

## PREVALENCE

Approximately 33 million couples are currently protected from unwanted pregnancy by vasectomy, according to an estimate based on survey data and family planning program service statistics (see Table 3). This includes only couples where the wife is of reproductive age, not older couples, even though the male partner may have had a vasectomy. Over 90 percent of these couples are in four countries—China, India, the United States, and the United Kingdom. Vasectomy is rare in Latin America and the Caribbean and very rare in Africa and the Middle East. In most countries with data available, the annual number of vasectomies performed peaked during the 1970s and has since declined (see Table 4).

### Asia

In the **People's Republic of China** about 12 million couples—7 percent of all couples of reproductive age—are protected by vasectomy. This amounts to about 36 percent of all users worldwide. Chinese service statistics indicate that an average of 1.7 million vasectomies were performed annually between 1971 and 1978 (see Table 4). During the same period, an average of 2.5 million female sterilization procedures were performed annually (551) (see **Population Reports**, *Population and Birth Planning in the People's Republic of China*, J-25, January-February 1982). According to a 1982 survey of over 300,000 women age 15 to 67, there are in all of China an estimated 170 million married women of reproductive age. A total of 118 million—69 percent—use a contraceptive method. Of these contracepting couples, 10 percent rely on vasectomy, 50 percent rely on IUDs, 25 percent on tubal ligation, 8 percent on oral contraceptives, and 2 percent on condoms (97).

Currently, the national ratio of male sterilization to female sterilization is two to five (97), but it varies considerably from one region to another. Vasectomy is far more common in Sichuan province, where one-tenth of all Chinese live, than elsewhere (375). In one commune in Sichuan more than 40 percent of contracepting couples are relying on vasectomy, and the ratio of vasectomies to tubal ligations is 121 to 1 (411).

Male and female sterilizations may be an increasingly important element in China's campaign to limit population growth (506). While Chinese leaders endorse a wide choice of contraceptive methods, they have emphasized low-cost, highly effective methods—the IUD and sterilization (96). In January 1983 an intensive drive to promote birth planning, as the Chinese call family planning, reportedly resulted in a total of 3.58 million sterilization pro-

cedures in one month, almost as many as performed each year during the 1970s (2, 239). The proportion of these recent procedures that were vasectomies has not been reported. Recent news reports suggest that the Chinese government now emphasizes sterilization for couples with two or more children. The government considers this emphasis necessary because the current population growth rate—1.45 percent—jeopardizes attainment of the government goal of a population of no more than 1.2 billion by the year 2000 (529).

In **India,** only 23 percent of the estimated 119 million couples of reproductive age use some form of contraception, but 87 percent of these rely on male or female sterilization (480). Vasectomy accounts for about half of all sterilizations, or about 12 million couples (4, 260, 356, 357, 366). This amounts to about 10 percent of Indian married couples of reproductive age (480) and about 36 percent of all users of vasectomy worldwide (see Figure 3). Over 21 million vasectomies have been reported in India since 1965 (365, 366).

Government program decisions have heavily influenced the annual number of vasectomies performed in India. Vasectomy began on a large scale in 1966, when the national family planning program began emphasizing voluntary sterilization. While hospitals and health centers provided female sterilization, mobile teams and special clinics in railway stations were also used to provide vasectomy services (366). Some states offered payments to acceptors. In 1970 mass sterilization camps began, mostly for vasectomy. The number of vasectomies increased from 900,000 in fiscal year 1970-71 to 2.6 million in 1972-73 (260, 366). Concern over the quality of services and a major cutback in government funding of family planning ended the camps during fiscal year 1973-74 (190). Only 400,000 vasectomies were performed in 1973-74 and 600,000 in 1974-75. Under the "National Emergency" declared in June 1975, the number of vasectomies increased to 1.6 million in 1975-76 and 6.2 million in 1976-77. Strong disincentives, such as denying ration cards and shop licenses to those not sterilized, contributed to the increase in vasectomies, and charges of coercion helped defeat the ruling party in the March 1977 elections (190). The number of vasectomies declined dramatically the following year and then recovered to the current level of about 570,000 annually (260, 366, 480).

**Table 3. Estimated Number of Couples Relying on Vasectomy Worldwide, 1983**

| | Number of Couples Protected by Vasectomy (in 1,000s) |
|---|---|
| **DEVELOPING COUNTRIES** | |
| **Asia** | |
| **China** | 12,000 |
| **India** | 12,000 |
| **Other Asia** | 1,600 |
| **Latin America & Caribbean** | 30 |
| **Middle East & Africa** | 1 |
| **Subtotal** | 25,631 |
| **DEVELOPED COUNTRIES** | |
| **United States** | 5,000 |
| **United Kingdom** | 1,100 |
| **Other developed countries** | 1,200 |
| **Subtotal** | 7,300 |
| **TOTAL** | 32,931 |

**Table 4. Number of Vasectomies Performed Annually in Selected Countries, 1971–1981**
(in 1,000s)

| Area & Country | Ref. No. | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ASIA** | | | | | | | | | | | | |
| **Bangladesh**[1] | 204, 259 | 0.1 | 0.2 | 0.4 | 14.4 | 37.8 | 75.0 | 33.1 | 24.7 | 27.5 | 26.0 | 69.2 |
| **China** | 551 | 1,223.5 | 1,715.8 | 1,933.2 | 1,445.2 | 2,652.7 | 1,490.0 | 2,616.0 | NA | NA | NA | NA |
| **India**[1] | 366, 480 | 1,620.1 | 2,613.3 | 403.1 | 612.0 | 1,438.3 | 6,199.2 | 187.6 | 391.0 | 472.7 | 434.6 | 570 |
| **Korea, Rep. of** | 279, 357 | 18.6 | 16.9 | 24.5 | 30.0 | 47.0 | 45 | 54 | 37 | 26 | 28 | NA |
| **Nepal**[1] | 11, 358 | NA | 3.9 | 4.3 | 5.0 | 3.8 | 11.0 | 12.1 | 7.0 | 4.3 | 4.8 | 10.4 |
| **Philippines** | 357, 358, 359, 414 | 0 | 0 | 0 | 0.4 | 9.2 | 10.3 | 8.0 | 4.3 | 2.0 | 1.9 | 1.8 |
| **Sri Lanka** | 241, 357, 477 | 0.2 | 0.5 | 1.9 | 7.3 | 6.0 | 2.9 | 1.3 | 2.3 | 5.6 | 51.0 | 29.0 |
| **Thailand** | 358, 412 | NA | 2.6 | 4.0 | 6.8 | 7.5 | 10.1 | 19.1 | 44.3 | 35.3 | 31.1 | 28.4 |
| **LATIN AMERICA** | | | | | | | | | | | | |
| **Colombia** | 237 | 0.6 | 0.9 | 1.0 | 1.1 | 0.9 | 0.8 | 0.7 | 0.7 | 0.6 | 0.6 | 0.5 |
| **Guatemala** | 115 | NA | NA | NA | NA | NA | NA | NA | 0.7 | 0.8 | 1.1 | 1.5 |
| **DEVELOPED COUNTRIES** | | | | | | | | | | | | |
| **Denmark**[1,2] | 265 | NA | NA | NA | 4.3 | 9.7 | 9.6 | 6.3 | 4.9 | 4.3 | 4.8 | 4.7 |
| **Finland** | 394 | 0.3 | 0.4 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| **Netherlands** | 256 | 7 | 16 | 27 | 31 | 31 | 39 | 37 | 51 | 69 | 55 | 42 |
| **United States** | 40 | 701 | 554 | 432 | 515 | 504 | 507 | 437 | 461 | 435 | 511 | 424 |

NA = not available

[1]Data are for fiscal year beginning in calendar year indicated.
[2]1976 figure covers period April 1–December 31, 1976, plus one-quarter of all vasectomies for period April 1, 1975–March 31, 1976. Data for later years (1977–1981) do not cover vasectomies performed in outpatient setting.

**Table 5. Use of Vasectomy and Female Sterilization as Reported in Representative Sample Surveys of Married Women of Reproductive Age, 1973–1982**

| Region, Country, Year, & Ref. No. | % Using | | | % of Contraceptors Using | |
|---|---|---|---|---|---|
| | Any Method | Vasectomy | Female Sterilization | Vasectomy[a] | Female Sterilization[a] |
| **AFRICA & MIDDLE EAST** | | | | | |
| **Sudan (North) 1979*** (494) | 6 | 0 | 0 | 2 | 5 |
| **ASIA & PACIFIC** | | | | | |
| **Bangladesh** | | | | | |
| **1975-76** (93) | 8 | 1 | 0 | 6 | 4 |
| **1979** (52) | 13 | 1 | 2 | 7 | 19 |
| **1981** (52) | 19 | 1 | 4 | 4 | 22 |
| **China 1982** (97) | 69 | 7 | 18 | 10 | 25 |
| **Korea, Rep. of,** | | | | | |
| **1974** (93) | 35 | 3 | 2 | 9 | 5 |
| **1979** (322) | 54 | 6 | 15 | 11 | 27 |
| **Malaysia 1974** (93) | 33 | 0 | 3 | 1 | 10 |
| **Nepal 1976** (93) | 2 | 2 | 0 | 67 | 4 |
| **1981** (556) | 7 | 3 | 2 | 41 | 34 |
| **Pakistan 1975[b]** (93) | 5 | 0 | 1 | 2 | 17 |
| **Philippines 1978** (93) | 36 | 1 | 5 | 2 | 13 |
| **Sri Lanka 1975** (93) | 32 | 1 | 9 | 2 | 29 |
| **Thailand 1975** (93) | 33 | 2 | 6 | 6 | 19 |
| **1978** (322) | 53 | 4 | 13 | 7 | 24 |
| **1981** (249) | 58 | 4 | 19 | 7 | 32 |
| **LATIN AMERICA & CARIBBEAN** | | | | | |
| **Barbados 1980-81** (345) | 46 | 0 | 13 | 1 | 31 |
| **Colombia 1980** (109) | 49 | 0 | 11 | 1 | 22 |
| **Costa Rica 1976** (93) | 64 | 1 | 12 | 2 | 19 |
| **1978** (322) | 65 | 1 | 13 | 1 | 20 |
| **1981** (413) | 65 | 1 | 16 | 1 | 25 |
| **El Salvador 1978** (322) | 34 | 0 | 18 | 1 | 52 |
| **Guatemala 1978** (322) | 18 | 0 | 6 | 2 | 33 |
| **Mexico 1976-77** (93) | 30 | 0 | 3 | 1 | 9 |
| **Panama 1976** (93) | 54 | 0 | 21 | 1 | 39 |
| **1979-80** (322) | 61 | 0 | 29 | 1 | 48 |
| **DEVELOPED COUNTRIES** | | | | | |
| **Norway 1977*** (66, 557) | 71 | 2 | 4 | 3 | 6 |
| **UK (England & Wales) 1976** (135) | 86 | 9 | 9 | 10 | 10 |
| **US 1973** (160) | 70 | 8 | 9 | 11 | 12 |
| **1976** (325) | 68 | 9 | 10 | 13 | 14 |
| **1982*** (161) | 61 | 9 | 12 | 15 | 20 |

Surveys include users of douche, abstinence, and "other" among total contraceptive users, and exclude abortion. Exceptions: Rep. of Korea, 1979; Thailand, 1978; Costa Rica, 1978; El Salvador, 1978; Guatemala, 1978; and Panama, 1979-80 exclude douche, abstinence, and "other." Bangladesh, 1979 and 1981; Nepal, 1981; Barbados, 1980-81; Colombia, 1980; and Costa Rica, 1981 exclude abstinence and douche. UK, 1976 and US, 1973, 1976 exclude abstinence. Thailand 1981 excludes abstinence and includes abortion.

Percentage of contraceptors relying on vasectomy was found to be less than 0.5 percent by Contraceptive Prevalence Surveys in 9 states of **Brazil**, 1978-81 (323); **Colombia**, 1978 (322); **Jamaica**, 1979 (322); **Mexico**, 1978 (322); and **Tunisia**, 1979 (322); and by World Fertility Surveys in **Colombia**, 1976 (93); **Czechoslovakia**, 1977 (289); **Dominican Republic**, 1975 (93); **Fiji**, 1977 (93); **Guyana**, 1975 (93); **Indonesia**, 1976 (93); **Italy**, 1979 (289); **Jamaica**, 1975-76 (93); **Jordan**, 1976 (93); **Kenya**, 1977-78 (253); **Lesotho**, 1977 (287); **Paraguay**, 1979 (367); **Peru**, 1977-78 (93); **Poland**, 1977 (289); **Senegal**, 1978 (289); **Syria**, 1978 (498); **Trinidad & Tobago**, 1977 (509); **Turkey**, 1978 (197); **Venezuela**, 1977 (520); and **Yugoslavia**, 1976 (289).

0 = <0.5

*Women surveyed are currently in union (Latin America & Caribbean) or married (elsewhere), age 15-44 or 15-49. Exceptions are: **Costa Rica**, 1976 and **Panama**, 1976: women currently in union 20-49; **Norway**: women in first marriage; **Sudan**: fecund, nonpregnant, married women (including users of voluntary sterilization); **US**, 1982: married and unmarried women age 18-44.

[a]Figures are not derivable from preceding columns due to rounding.

[b]Pakistan—Respondents were asked about use only after they spontaneously mentioned method in knowledge section of survey.

Female sterilization in India increased steadily from 94,000 in fiscal year 1965-66 to 2,214,000 in 1981-82. This increase, combined with the decrease in vasectomies, reduced vasectomies to an all-time low of 21 percent of all Indian sterilizations in 1981-82 (480). Female sterilization is increasing not only because vasectomy was set back more by the Emergency, but also because the introduction of new techniques for female sterilization—minilaparotomy and laparoscopy—have made the procedure safer and faster than before and, in the case of laparoscopy, more interesting to doctors.

Vasectomy is widely used in five other Asian countries—South Korea, Thailand, Bangladesh, Nepal, and Sri Lanka (see Tables 4 and 5). In **South Korea** the estimated percentage of couples of reproductive age relying on vasectomy doubled, rising from 3 percent, reported in the 1974 World Fertility Survey (WFS) (93), to 6 percent, reported in the 1979 Contraceptive Prevalence Survey (CPS) (322). Service statistics indicate a decline in the annual number of procedures from a peak of 54,000 in 1977 to 28,000 in 1980 (357). In **Thailand** vasectomy prevalence doubled in six years, rising from 2 percent in the 1975 WFS (93) to 4 percent in the 1981 CPS (249). In 1978, when minibuses carried medical personnel to outlying areas to perform vasectomies (503), the number of procedures peaked at 44,000. Although the number declined to 28,000 by 1981, there were still 50 percent more procedures in 1981 than in 1977 (412, 503). In both South Korea and Thailand the annual number of female sterilizations increased throughout the 1970s but now appears to have leveled off (357, 412).

In **Bangladesh** the number of vasectomies began to rise in 1975 when vasectomy camps were opened and compensation—which had been offered in the 1960s but was discontinued in the early 1970s—was resumed. These payments covered clients' costs and work time lost. There was another sharp increase in the number of vasectomies in early 1977, when 66,000 procedures were performed during an 8-week national campaign (207, 393). The number of vasectomies declined to about 25,000 in 1978 and remained relatively constant through 1980. In 1981 the number more than doubled, to 69,271, after the compensation payment to acceptors was raised from 60 taka (US $4) to 96 taka ($6.40) (477). Still, the 1981 Contraceptive Prevalence Survey in Bangladesh found that less than one percent of couples relied on vasectomy (52).

Contraceptive use is slight in **Nepal**—only 6.8 percent as measured by a 1981 CPS—but voluntary sterilization is the major contraceptive method. Some 75 percent of all contracepting couples rely on sterilization, and just over half of these rely on vasectomy. This amounts to 2.8 percent of couples of reproductive age (556). Difficult communication and transportation in Nepal make a simple, one-time procedure such as vasectomy or female sterilization attractive.

While in **Sri Lanka** one percent of couples of reproductive age relied on vasectomy in 1975 (93), use of the method has increased substantially since. Service statistics reveal that there was a 10-fold increase in the number of vasectomies performed between 1979 and 1980. This coincided with the government's introduction of payments to acceptors. The number of acceptors dropped after the govern-

ment discontinued these relatively high payments in early 1981 (125, 477) (see p. D-91).

### Developed Countries

Including both men and women, more couples in the **United States** rely on sterilization than on any other contraceptive method. An estimated 7.5 million men have had vasectomies (114). Currently, about 4.9 million couples of reproductive age, or 9 percent, rely on vasectomy. Approximately 6.8 million couples, or 12 percent of couples of reproductive age, rely on female sterilization (161).

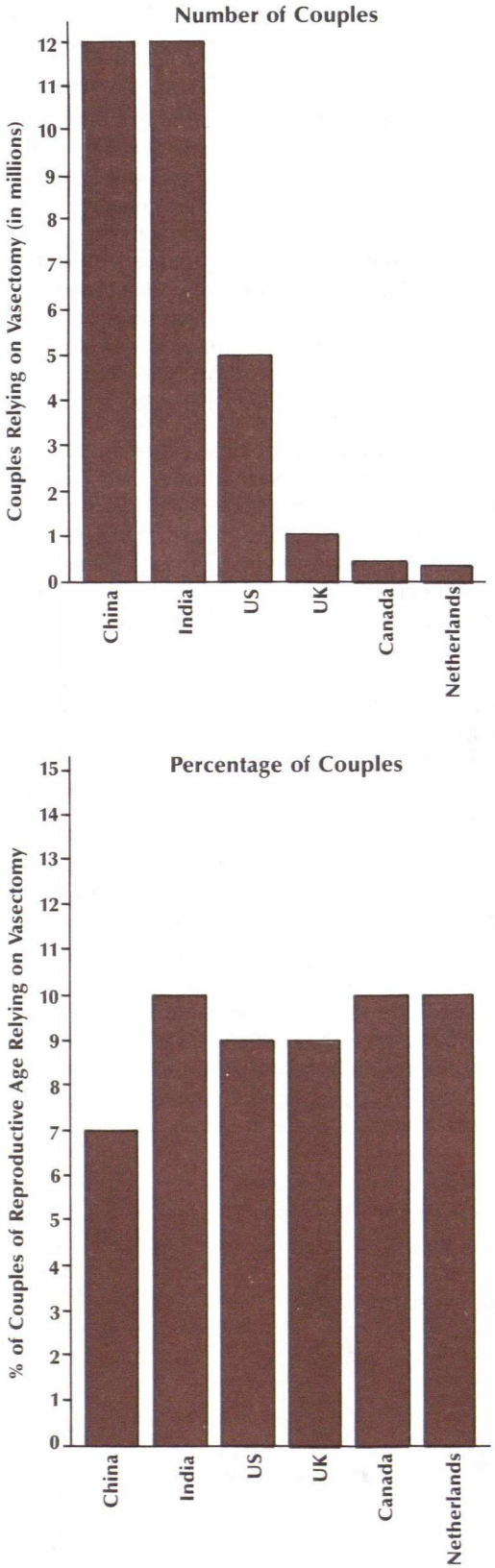
Vasectomy has a long history in the US, with an upward trend in the proportion of males vasectomized seen as early as 1960 (91). During the late 1960s and early 1970s the popularity of the method soared. The state of Pennsylvania, for example, experienced nearly a 2,000 percent increase, from 576 vasectomies in 1968 to 10,882 in 1971 (1). Nationally, in 1971 a peak number of 701,000 vasectomies was performed (40).

The increase in the popularity of vasectomy occurred for several reasons. In the late 1960s and early 1970s the number of women using oral contraceptives declined, probably because of publicity about health hazards. At the same time the medical community announced its support of vasectomy (7). National and international organizations such as AVS, the Planned Parenthood Federation of America, and Zero Population Growth promoted the method extensively.

From 1972 to 1981 between 424,000 and 554,000 vasectomies were performed each year, according to AVS estimates (see Table 4). These estimates are based on data gathered by AVS from clinics and military facilities and on a sample survey of private physicians conducted for AVS by Intercontinental Medical Statistics America Ltd. (40). A drop in the number of vasectomies in 1977 coincided with the increased availability and publicity about female sterilization (42, 398). The number of both vasectomies and tubal ligations declined again in 1981 and 1982 (40, 398). AVS has suggested that a combination of factors is responsible—economic constraints, "ideological pressures on family planning," and, in the case of vasectomy, mass media attention to reports—not confirmed in humans—of atherosclerosis in vasectomized monkeys (45) (see p. D-71). A decline in the annual number of vasectomies does not necessarily mean that the prevalence of vasectomy is declining among couples of reproductive age. The number of couples relying on vasectomy who are leaving the reproductive age group each year is still less than the number of vasectomies performed.

Surveys in the 1960s and 1970s found that vasectomy was more common in the western US than other regions of the country and was particularly popular along the Pacific coast (87, 91, 406). A 1968 survey of one county in California found that 16 percent of married white couples (wives age 20-54) were protected by vasectomy, a prevalence five times greater than the 1965 national average (381). In 1970 14.2 percent of couples of reproductive age in the Pacific states of California, Oregon, and Washington relied on vasectomy, compared with 5.1 percent nationwide (406). In this region vasectomies were about four times more common than tubal ligations, which were only slightly more common than the national average (406).

**Figure 3. Estimated Number and Percentage of Couples of Reproductive Age Relying on Vasectomy, Selected Countries**




Source: based on data from China Population Information Center (China) (97), Soni (India) (480), Forrest & Henshaw (US) (161), Bone (UK) (80), Dunnell (UK) (135), Marcil-Gratton & Lapierre-Adamcyk (Canada) (306), Ketting (Netherlands) (256), and Visaria (560).

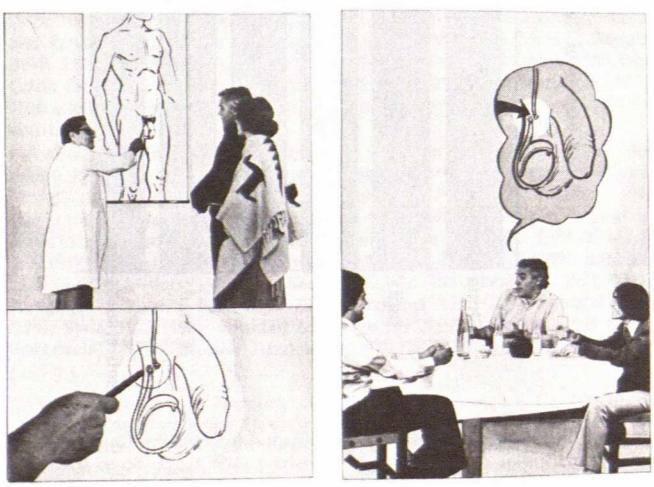
**The largest numbers of couples relying on vasectomy are in China and India. A large percentage of couples in the US, UK, and several other developed countries rely on vasectomy.**

Why vasectomies are so popular in the Pacific region is not known. Researchers have suggested that the Catholic Church had less influence on the attitudes and practice of doctors in the Pacific region than in other parts of the country (87, 406). Once the procedure became common in the area, word-of-mouth recommendations probably contributed to greater acceptance.

In the **United Kingdom** an estimated 1.1 million couples rely on vasectomy. Both male and female sterilizations have been available through the National Health Service since the early 1970s and, like other contraceptive methods, have been provided free of charge since 1974 (80). In 1970 more couples relied upon female sterilization than on vasectomy, but by the time of the most recent survey, in 1976, the numbers were approximately equal (80). If this trend has continued, the percentage of contraceptors currently relying on vasectomy probably exceeds the level of 9 percent reported in 1976 (see Table 5).

Vasectomy is also popular in three other developed countries—New Zealand, the Netherlands, and Canada. **New Zealand** may have the highest vasectomy prevalence of any developed country, although up-to-date information is not available. Studies in the mid and late 1970s and annual statistics gathered by the Department of Health suggest that over 30 percent of couples of reproductive age rely on sterilization and that approximately one-half of these sterilizations are vasectomies (162, 351, 382). The health department statistics, collected only since 1978, indicate a decline in the annual number of sterilizations performed, from nearly 13,000 in 1978 and 1979 to about 8,300 in 1982. Vasectomies accounted for 3,594 or 42 percent of all sterilization procedures in 1982 (162).

Ten percent of couples in the **Netherlands** rely on vasectomy, and 10 percent rely on female sterilization (256). The annual number of procedures, for both males and females, peaked in 1979 and has since declined, but the overall prevalence remains about 20 percent. In **Canada**, too, at least 10 percent of couples are protected by vasectomy. A 1982 survey reported a vasectomy prevalence rate of 10 percent in Quebec. Statistics on the annual number of vasectomies in other Canadian provinces during 1971-78 suggest that the rates there are even higher (306).



**A 16-page picture booklet developed by PIACT de México helps explain vasectomy to nonliterate couples. At left, the doctor describes the procedure to husband and wife. At right, the satisfied user talks to friends.** (PIACT de México)

### Other Countries

Vasectomy is rare in Latin America and even more so in Africa and the Middle East. In no country in these regions for which data are available are more than one percent of all couples of reproductive age protected by vasectomy. Special efforts to provide services and promote vasectomy have had some success, however. In **Guatemala**, the Asociación Pro-Bienestar de la Familia (APROFAM), an affiliate of IPPF, has built an active vasectomy program in Guatemala City. From 1978 to 1982, 5,345 vasectomy procedures were carried out. In 1982 APROFAM performed 55 percent of all vasectomies done by IPPF affiliates in Latin America (115). In São Paulo, **Brazil**, Promoção de Paternidade Responsável (PROPATER) started clinical vasectomy services in 1981. In 30 months, by June 1983, the clinic had performed over 2,650 vasectomies (9) (see p. D-94).

## PROGRAM ISSUES

Acceptance of vasectomy has declined recently, while female sterilization increases. Yet vasectomy is highly appropriate for developing as well as developed countries, since it is easy to perform, effective, safe, and inexpensive. In 1982 the First International Conference on Vasectomy, held in Sri Lanka, identified two major obstacles to vasectomy acceptance: (1) cultural beliefs and attitudes, and (2) bias against vasectomy on the part of physicians and program administrators (see box, p. D-88). These problems are not insurmountable. Successful efforts in several Latin American and Asian countries show that men do accept vasectomy and responsibility for contraception when well-designed programs are established.

### Acceptability

While large numbers of men have undergone vasectomy, cultural barriers persist in many areas. Generally, aversion to vasectomy or lack of interest stems from:

- traditional attitudes regarding male and female roles in society,
- religious opposition or ambivalence about permanent methods of birth control, and
- fears and misconceptions about the effect of vasectomy on sexual performance.

Men from all cultures have expressed interest in vasectomy, however, suggesting that these barriers can be overcome (46, 238).

In many cultures the attitude prevails that contraception is a woman's responsibility. Since women experience pregnancy and childbirth and also care for the children, they are assumed to have more to gain from practicing family planning (226). Also, men are usually the principal breadwinners, and their time is perceived as more valuable to the family or community. Thus they are less willing to undergo any health risks or inconveniences associated with contraception (70). Sometimes, however, vasectomy can appeal to men who are accustomed to making all major family decisions (131).

In many countries, particularly in sub-Saharan Africa, a man's value is largely measured by his ability to father

children. Infertility deprives him of social status and respect. A permanently sterile man may be unable to marry again if his first wife dies (303, 346). The premium on fertility is so high that in some areas men who have vasectomies tell no one, not even their wives (303).

Fear of sexual problems after vasectomy is common (14, 70, 184, 303, 305, 354). Men confuse vasectomy with castration and believe that the operation will cause impotence and loss of sexual desire and virility. Some languages lack simple words that distinguish sterilization from castration. Another common misconception is that vasectomized men do not ejaculate. Incorrect beliefs can be countered by information and education programs. For men who equate fertility with masculinity, however, vasectomy may still be unacceptable.

Wives also sometimes oppose vasectomy. Some women worry that the operation will make their husbands impotent and weak (303, 392). In Indonesia, for example, 78 percent of almost 500 women surveyed did not want their husbands to be vasectomized because they thought that the surgery might interfere with their husbands' ability to earn a living and support their families (470). Other women fear that vasectomy will free their husbands to engage in extramarital affairs (108, 303).

### Legal Barriers

A few countries have legalized voluntary sterilization by statute. In most countries voluntary sterilization is either legal because no law prohibits it, or the legal status is unclear and there is no specific prohibition (see **Population Reports,** *Legal Trends and Issues in Voluntary Sterilization,* E-6, March-April 1981). Voluntary sterilization for contraception is illegal by a specific prohibition in the criminal code or by formal decree in only four countries—Burma, Saudi Arabia, Somalia, and Spain.

In most Latin American countries statutes and medical codes, influenced by continental European legal doctrine, seem to restrict voluntary sterilization. In practice, however, the question of legality has seldom been raised. Female sterilization is widespread and increasing in popularity. Where political questions are raised, however, it may be easier to justify female sterilization to protect high-risk mothers directly than to justify vasectomy, which would not protect the individual undergoing the procedure. Some governments—Colombia, El Salvador, Mexico, Jamaica, and Panama—support voluntary sterilization services (490).

In Africa the legal status of sterilization varies. Most countries in Anglophone Africa, following the British example, have no legal provisions or statutes concerning voluntary sterilization, and therefore it is legal. In Francophone Africa, by contrast, many countries have laws derived from the French Napoleonic Code banning acts causing "grave corporal injury," which in the past have been interpreted as prohibiting voluntary sterilization. The 1982 criminal code of Ivory Coast, although it specifies the death penalty for sterilization along with murder and castration, exempts medical procedures performed by doctors on consenting patients in accord with "scientific data, medical ethics, and accepted practice." This would appear to legalize voluntary contraceptive sterilization (229, 488).

## *What Men Say About Vasectomy*

*Talking with men who have had vasectomies often helps a man decide to have a vasectomy himself, as men attending a vasectomy clinic in Houston, Texas, indicate (338):*

I have known this friend for five years, and he had a vasectomy three years ago. He said it was the best thing you can do.

I've probably talked to over 100 men who had it over the last 10 years.

My father had one 18 years ago. He just told me three days ago. I don't think my mother knows about it. He told me all the details and about six other men we know.

I'm going to be the example at the plant. Everybody's waiting to see how I turn out.

*Jim Bouton, baseball player, author, and broadcaster, cites a number of reasons that he had a vasectomy (553):*

I felt that birth control was as much a man's responsibility as a woman's. Also, my wife was having a bad reaction to the pill, and other birth control methods seemed either awkward, unsafe, or unreliable.

*Many men find that vasectomy improves their married life (553):*

The peace of mind has made sex more enjoyable for my wife and me.

Not a day goes by that I don't thank myself for it. Our sex life is better than ever now that we know there's no possibility Louise can get pregnant. The operation has brought us emotionally closer, too.

Recently, Turkey legalized voluntary contraceptive sterilization for those over age 18 except where medically contraindicated. Consent of the spouse is required (157). The new statute replaces one of the few statutes that had specifically outlawed voluntary sterilization. In Tunisia voluntary sterilization has been legal by presidential decree since 1973. In other Islamic countries, the legal status of sterilization is less clear. The Koran, the main source of law for many Muslims, does not expressly mention sterilization. Over the last decade many different views have been expressed in Islamic countries and discussed at various family planning and law conferences (208, 324, 341, 349, 489). If sterilization were more easily reversed, it might be more acceptable under Islamic law (349).

Government policies in Islamic countries vary. Pakistan and Bangladesh, for example, emphasize voluntary sterilization as an important part of national fertility control programs. By contrast, Malaysia and Indonesia are reluctant to include voluntary sterilization in their national family planning programs, although services may be available privately.

# *Findings and Recommendations of the First International Conference on Vasectomy, Colombo, Sri Lanka, October 4–7, 1982*

## FINDINGS

1. Vasectomy is one of the safest and most effective methods of contraception and is even safer and more widely deliverable than female methods of surgical contraception.

2. Men in every part of the world, and in every cultural, religious, or socioeconomic setting, have demonstrated interest in or acceptance of vasectomy, despite commonly held assumptions about male attitudes or societal prohibitions.

3. The greatest hindrances to increased acceptance of vasectomy appear to be the lack of services in appropriate settings, the reluctance of programs to initiate services, and the lack of specific information about what vasectomy is and is not.

4. The most important factor in an individual's decision to request vasectomy appears to be having had personal contact and a conversation with a man who has had a vasectomy and is satisfied with the procedure.

## RECOMMENDATIONS

### Educating Health Providers and the Public

- Programs should be launched to increase the knowledge and awareness of vasectomy among all levels of health and family planning personnel. Greater clarification of health provider attitudes and beliefs about vasectomy should be sought. Program administrators and health providers are too often convinced that men will not accept vasectomy for cultural, psychological, or religious reasons. It is recognized that an emotional inability to distinguish between masculinity and the ability to cause a pregnancy can be—and is—shared by providers as well as consumers; this belief can negatively influence the thinking of health providers.

- Special efforts must be made to inform and educate policy makers, health and family planning personnel, and the public about vasectomy so that it can be an available choice for people who wish to control their fertility. The mass media should be used, in nondirective and culturally appropriate ways, for public education to make vasectomy an acceptable topic of conversation and to provide accurate information about it.

- More extensive information on vasectomy should be made available through commercial channels. For example, short messages about vasectomy can appear on soap wrappers, matchboxes, bus tickets, postal envelopes, and pharmaceutical and personal hygiene products. To help desensitize the public about vasectomy, marketing techniques and advertising can also be utilized. Information activities can be incorporated into daily or community events so that males will become better educated about the method and the local availability of services.

### Counseling

- Since studies and experience show that the most important factor in a man's decision to accept vasectomy is contact with satisfied users, programs should make concerted and continuous efforts to include these users in education and counseling programs. Acceptor clubs for vasectomized men can be established, for example. Programs should continue to use interpersonal communication, primarily individual and group meetings, as the chief means of educating people about vasectomy.

### Surveying the Needs of Consumers

- Establishing whether there is demand for vasectomy in a geographical area can best be accomplished by directly surveying the attitudes and wishes of men in that area. To guide planning for information activities, programs should undertake studies of men's attitudes toward vasectomy to determine specific barriers, if any, that exist.

### Creative, Quality Programming

- High-quality, prestigious service centers are essential in delivering vasectomy as a contraceptive choice. Quality is essential both to provide humanistic care and to increase the number of satisfied clients who are potentially important communicators about vasectomy. In all service delivery centers, preoperative screening and counseling and postoperative patient follow-up, in addition to expert surgical care, are essential.

- Male-oriented vasectomy centers that make men feel comfortable should be developed. These centers may offer other male health services in addition to vasectomy. Supportive services can be included so that a relaxed and comfortable atmosphere is achieved.

- When a vasectomy program in a large rural area is initiated, mobile approaches should be used to help extend information and services. When acceptance in an area has increased, mobile services can be replaced by a reliable system for referring or transporting clients to a static center.

### Surgical Personnel

- Planners should make every effort to use well-trained physicians for the delivery of services. Physicians should be motivated, encouraged, and reimbursed sufficiently so that they want to include vasectomy in their delivery systems, whether public or private.

- While it has been shown that paramedicals have been trained in some settings to deliver safe, efficient vasectomy services, countries attempting to initiate national programs should do so through their network of trained physicians. In some instances, particularly in rural areas, where physicians are not in sufficient supply, paramedicals can be trained to perform vasectomies according to high standards of competence and safety.

Source: Atkins, B.S. and Jezowski, T.W. Report on the First International Conference on Vasectomy. Studies in Family Planning 14(3): 89–95. March 1983.

### Cost Barriers

Where free or reduced-price services are not available, cost may be a barrier to men who want vasectomies. Most government family planning programs that provide vasectomy do so free or for a nominal fee (357). When fees are charged, they are usually equal to or less than fees charged for female sterilization. Examples are government programs in Colombia; where sterilization costs for both males and females range from $5 to $10 (US), and Taiwan, where a vasectomy costs $20 and female sterilization, $45 (357, 431).

By contrast, the price of vasectomies from private doctors in developing countries can range from $8 in Bangladesh to $700 in Brazil (431). In Latin America and the Middle East prices generally range from $100 to $200, with female sterilization costing about $100 more. In Asian countries, the price is generally less than $50, but prices can vary considerably within countries. In Thailand, for example, the price of a vasectomy may range from $30 to $150, compared with $60 to $250 for female sterilization (431). In the US the average cost of a vasectomy is about $200 when performed in a freestanding clinic or outpatient facility and about $240 when performed by a private physician. Comparable rates for female sterilization are about $500 and $1,200, respectively (38, 508). In the UK the price of a vasectomy ranges from $30 to $175, and for female sterilization, from $160 to $580 (77).

While the price of sterilization may appear to be high in some places, the one-time expense of the procedure is often lower than the cost of temporary methods used for many years (38). In a survey of 20 developing countries, Bruce Schearer found that, when the prices of contraceptives in the private sector were translated into annual costs, the annual average cost for a vasectomy was about $23, compared with about $34 for female sterilization or for condoms, about $26 for oral contraceptives, and $23 for IUDs (431). These estimates, which may be high, assume that both vasectomy and female sterilization provide protection for an average of seven years, 120 condoms are used per year, and an IUD is used for an average of 2½ years. For four Asian countries—Bangladesh, Indonesia, South Korea, and Thailand—the annual cost for vasectomy averaged about $7, compared with $14 to $16 for all other methods (431).

### Program Barriers

Participants in the First International Conference on Vasectomy concluded that several professional and program factors hinder the acceptance of vasectomy (46) (see box, p. D-88). These include:

- lack of services and particularly services specifically for men,
- emphasis on providing female sterilization, and
- negative attitudes of physicians toward vasectomy.

In many developing countries vasectomy is not widely available. Often vasectomy services are not part of the national family planning program (226, 390, 414). As noted, legal barriers exist in a few countries. In others, administrators assume that men will not want vasectomy, and they give priority to female methods. Privately funded as well as government programs may not offer or promote vasectomy. A 1979 IPPF survey reported that only 27 of 76 member associations provided vasectomy, while 41 offered female sterilization (226).

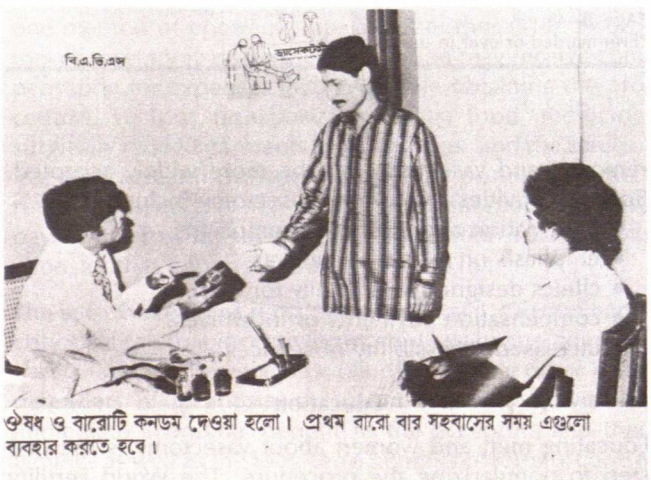
Family planning programs began promoting female sterilization more than vasectomy when the development of new techniques—minilaparotomy and laparoscopy—made the female operation cheaper, easier, and safer than earlier female sterilization methods. Also, female sterilization offers immediate benefits to women who would face health problems from pregnancy and childbirth. Thus female sterilization can be offered to a woman as a preventive health measure, while vasectomy serves no purpose to men besides contraception. Terence Jezowski and Javed Ahmad suggest that some professionals, particularly in countries where contraception is controversial, may avoid vasectomy precisely because it is known as a family planning method (238).

Lack of high-level interest in vasectomy is reflected in the emphasis on women in family planning clinics and programs. Counselors and field workers usually are women and deal mostly with other women. Thus both field workers and potential clients may be uncomfortable discussing vasectomy and clients' concerns about possible sexual side effects. Community outreach programs for men also are rare. Except in China, few programs attempt to contact men at home or in the workplace (89).

Relatively few physicians in developing countries promote vasectomy programs. Most physicians working in family planning specialize in maternal and child health and are not experts in vasectomy. Also, the new techniques of female sterilization—particularly laparoscopy—interest physicians more than the simple vasectomy procedure. A concerted effort to change the attitudes of family planning physicians would probably lead to more vasectomy procedures. Finally, in many countries physicians receive considerably higher fees for performing female sterilization (46, 238). In South Korea, for example, physicians receive 20 percent more for a female sterilization than for a vasectomy. In Taiwan in 1981 the national family planning program paid physicians from $14 (US) to about $34 for each vasectomy and about $34 to $73 for each female sterilization (357).

### Program Strategies

Successful vasectomy programs in a number of countries show that both cultural and program barriers can be




ঔষধ ও বারোটি কনডম দেওয়া হলো। প্রথম বারো বার সহবাসের সময় এগুলো ব্যবহার করতে হবে।

**Condoms or another contraceptive method must be used after vasectomy until sperm are cleared from the male reproductive tract. A booklet for potential vasectomy clients, prepared by the Bangladesh Association for Voluntary Sterilization, stresses this.**

**Table 6. Knowledge and Use of Sterilization Among Currently Married Women Age 15–49 in Representative Sample Surveys, 1974–1982**

| Region, Country, Year, & Ref. No. | % Knowing of | | % Using | |
|---|---|---|---|---|
| | Male Sterilization | Female Sterilization | Male Sterilization | Female Sterilization |
| **AFRICA & THE MIDDLE EAST** | | | | |
| **Jordan 1976** (93, 518) | 19 | 79 | 0.1 | 1.8 |
| **Kenya 1977-78** (253) | 16 | 59 | 0.0 | 0.9 |
| **Lesotho 1977** (287) | 11 | 37 | 0.0 | 0.7 |
| **Sudan (North) 1979** (494) | 3 | 24 | 0.0 | 0.3 |
| **Syria 1978** (498) | 8 | 28 | 0.1 | 0.4 |
| **Turkey 1978** (197) | 10 | 40 | 0.2 | 0.5 |
| **ASIA & OCEANIA** | | | | |
| **Bangladesh 1975-76** (93, 518) | 52 | 54 | 0.5 | 0.3 |
| **1979** (52) | 71[a] | 85[a] | 0.9 | 2.4 |
| **1981** (52) | 72[a] | 92[a] | 0.8 | 4.0 |
| **Fiji 1974** (93, 518) | 96 | 40 | 0.1 | 15.8 |
| **Indonesia 1976** (93, 518) | 9 | 12 | 0 | 0.3 |
| **Korea, Rep. of, 1974** (93, 518) | 84 | 66 | 3.3 | 1.7 |
| **1979[b]** (267) | 95 | 96 | 6.1 | 14.7 |
| **Malaysia 1974** (93, 518) | 35 | 74 | 0.4 | 3.4 |
| **Nepal 1976** (93, 518) | 17 | 13 | 1.6 | 0.1 |
| **Pakistan 1975[c]** (93, 518) | 2 | 7 | 0.1 | 0.9 |
| **Philippines 1978** (93, 518) | 70 | 75 | 0.7 | 4.7 |
| **Sri Lanka 1975** (93, 518) | 39 | 84 | 0.7 | 9.2 |
| **Thailand 1975** (93, 518) | 71 | 81 | 2.1 | 6.3 |
| **1978** (249) | 96[a] | 97[a] | 3.5[b] | 13.0[b] |
| **1981** (249) | 87[a] | 93[a] | 4.2[b] | 18.7[b] |
| **CARIBBEAN & LATIN AMERICA** | | | | |
| **Colombia 1976** (93, 518) | 40 | 73 | 0.2 | 4.0 |
| **1978** (221) | 27 | 72 | 0.2 | 8.0 |
| **Costa Rica 1976[b]** (93, 518) | 68 | 94 | 1.0 | 12.3 |
| **1981** (221) | 62 | 97 | 0.5 | 17.3 |
| **Dominican Republic 1975** (93, 518) | 31 | 95 | 0.1 | 11.9 |
| **El Salvador 1978[b]** (221) | 82 | 97 | 0.2 | 17.8 |
| **Guatemala 1978[b]** (221) | 34 | 62 | 0.4 | 5.9 |
| **Guyana 1975** (93, 518) | 23 | 79 | 0.0 | 8.5 |
| **Jamaica 1975-76** (93, 518) | 41 | 88 | 0.0 | 8.1 |
| **Mexico 1976-77** (93, 518) | 39 | 68 | 0.2 | 2.7 |
| **1978** (221) | 30 | 68 | 0.1 | 7.4 |
| **Panama 1976[d]** (93, 518) | 65 | 94 | 0.4 | 21.2 |
| **1979-80[b]** (221) | 71 | 96 | 0.4 | 29.3 |
| **Paraguay 1979** (367) | 14[e] | 46[e] | 0.1[e] | 2.0[e] |
| **Peru 1977-78** (93, 518) | 19 | 60 | 0.0 | 2.8 |
| **Venezuela 1977** (520) | 32 | 88 | 0.1 | 7.9 |

[a]Ever-married women
[b]Age 15–44
[c]Spontaneously reported knowledge only; knowledge not probed. Respondents were asked about use only after they spontaneously mentioned method in knowledge section of survey.
[d]Age 20–49
[e]Ever-married or ever in union women

removed and vasectomy can be more widely accepted. Specific activities to promote vasectomy include:

- information and education campaigns,
- emphasis on personal contacts,
- clinics designed specifically for men,
- compensation payments or incentives,
- increased accessibility of services.

### Education

Educating men and women about vasectomy is the first step to popularizing the procedure. The World Fertility Survey (WFS) and Contraceptive Prevalence Surveys show that far fewer women know about vasectomy than about female sterilization (see Table 6). (Unfortunately, few surveys of men have been conducted.) In Latin American countries between 46 and 97 percent of women surveyed knew about female sterilization, compared with 14 to 82 percent who knew about vasectomy. Generally, rural women know of fewer contraceptive methods than do urban women, but they are even less likely to know about vasectomy than about female sterilization. In Guatemala, for example, only 20 percent of rural women had heard of vasectomy compared with 57 percent of urban women. By contrast, 51 percent of rural women and 80 percent of urban women were familiar with female sterilization (221).

In Africa and the Middle East, vasectomy is virtually unknown. In the 1979 WFS in Sudan, for example, only 3 percent of women surveyed knew of vasectomy, while 24 percent knew about female sterilization (494).

Only in South Korea and Nepal, where vasectomy is a major method, do more women know about vasectomy than about female sterilization. In a few other Asian countries knowledge of the two is about equal, while in others, such as Sri Lanka, Malaysia, and Fiji, only about half as many women know of vasectomy as know of female sterilization (see Table 6).

Information and education campaigns should be directed to potential clients and their wives, program administrators, and physicians (46, 238). Multiple media—radio, television, printed materials, posters—as well as interpersonal communication and counseling have been used. In Thailand messages about vasectomy are printed on matchbooks and on paper wrappers of soap and other household items (354). In Guatemala radio announcements and written materials are prepared in local Indian dialects as well as in Spanish (238). In Sri Lanka printed announcements describing vasectomy and listing times and locations for services were distributed to the public (383). As a result, men could go directly to vasectomy clinics without first requesting information from other local health centers. The PROPATER clinic in São Paulo, Brazil, mailed special announcement letters to doctors, social workers, and other social service professionals to promote vasectomy referrals (46, 237). The PROPATER program also has conducted extensive outreach activities. Staff workers regularly visit factories and speak to groups of workers. They also write articles about vasectomy in factory newsletters (46, 238).

### Personal Contacts

Person-to-person communication plays an important role in changing men's minds about vasectomy. Studying over 1,000 US men, Stephen Mumford found that most men decided to have a vasectomy only after talking with a vasectomized man. Lack of information from a reliable and influential source, not misinformation about vasectomy, is the major obstacle to acceptance, he concluded (334, 338). Another, smaller US study found that men are more likely than women to talk about sterilization with other people before undergoing the procedure (100). Thus, employing field workers and clinic personnel who have had vasectomies to promote the procedure and to counsel prospective clients may be highly effective (46, 237, 334). In Guatemala, the Philippines, and Thailand, vasectomy programs form "acceptor clubs" for vasectomized men to

provide both psychological support to acceptors and information and encouragement to other men considering the procedure (238, 456, 477). Word-of-mouth recommendations from other men who have had vasectomies are probably the most persuasive form of information in any setting.

Mumford's US study also found that men took from 2 to more than 10 years to make up their minds to have vasectomies (338). While this long process might be shortened by program information and education activities, it is clear that men need to learn about vasectomy early. Thus vasectomy should be included in discussions of family planning even with men who still want more children. This allows men to think about the idea in advance.

Women should learn about vasectomy, too, since their attitudes may influence their husbands. In Mumford's study, for example, wives played a major role in the decision to have a vasectomy in about half of the cases (337). In a Colombian study of 172 vasectomized men, about 22 percent had first learned about the procedure from their wives (138). Women who are well informed about vasectomy are likely to be happier with the procedure afterwards (335).

### Designing Programs for Men

Educational campaigns must be accompanied by services designed for men. Most family planning clinics focus on women. Separate clinics specializing in male methods and male health problems appear to be more acceptable to men. The success of a program often depends on the commitment of its leaders to vasectomy and to the involvement of men in family planning.

In Thailand the Chulalongkorn Hospital reorganized its vasectomy clinic in 1976 to make it more acceptable to men. Weekend clinics were opened so men would not have to miss work. Transportation to and from the clinic was provided for men who came in groups of three or more. The counseling and the procedure took place on the same day, whereas formerly men had had to make two trips to the clinic. Men could contact the clinic for information and reassurance during the week by means of a special "hotline" telephone number. After these changes were introduced, the number of vasectomy clients increased from 58 per month to 161 (137). Since vasectomy is a simple procedure, the promotion, advertising, and concentration of procedures in high-volume clinics serves several purposes. In addition to providing an environment that suits male clients, it reduces the cost of vasectomy and improves surgical care.

### Program Payments

National family planning programs in several Asian countries, including India, Bangladesh, Sri Lanka, South Korea, and China, have offered payments to vasectomy acceptors (357, 358). These payments are of two kinds: compensation or incentives, either to clients or providers. Compensation is intended to pay for the cost of undergoing the procedure, including time lost from work and travel expenses. Sometimes clean clothing and extra food are included as well as a small cash payment. Incentives, by contrast, are larger payments or important benefits designed to persuade an individual to undergo sterilization. Some countries—Singapore, for example—offer medical benefits and better housing after sterilization (156). In the Philippines some large companies offer paid vacations and loan privileges to sterilization acceptors (116).

In addition to payments for individual acceptors, some special payments may be made to (1) the family planning worker who recruited or motivated the men to undergo vasectomy, (2) the person performing the procedure, or (3) the health facility where the procedure is carried out (116, 316). Less frequently, the entire community receives some benefit. For example, in India the state government of Gujarat gives a bag of cement to the village council for each man in the village who accepts vasectomy (156). Any such payments create some risk of undue pressure, inaccurate counseling, not enough information about other methods, or falsification of records (99, 156, 258).

While both incentives and compensation can increase the number of vasectomies, it is not clear whether acceptors motivated mainly by a one-time payment are more likely to regret their decision later. In Sri Lanka the government in 1980 offered a modest payment of Rs 100 (about US $6.50) to vasectomy acceptors. Some months later payments increased to Rs 500 (US $32.50), in goods and cash, an amount equivalent to about one month's average wages. Requests for vasectomy to the national Family Planning Association increased from an average of 6 per day before payment to 35 per day at the lower level of payment and to about 150 per day at the higher level (125). The size of such payment has raised the question of whether it constitutes compensation or an incentive.

A small study comparing vasectomy acceptors before and after the increases in Sri Lanka found that the higher payments attracted men with larger families who were already using some form of contraception. It did not particularly attract men who had low incomes. Thus, the large payment encouraged the choice of vasectomy among men who had already decided to limit their families (125). By contrast, a small study in Bangladesh suggested that some men accepted vasectomy solely for the compensation and later regretted their decisions (258).

To ensure informed consent and freedom from undue pressures, US AID will not support programs which either offer incentives or have forms of payments that emphasize one method of contraception over another (516). Acceptors of vasectomy or female sterilization may receive compensation for expenses incurred while obtaining the procedure, such as transportation costs, food, medicine, surgically related garments and dressings, and the value of lost work. Health providers and family planning workers referring clients also may receive compensation, but these payments must be similar to compensation when clients choose other contraceptive methods (516).

The use of incentives remains controversial. On one hand, critics charge that incentives for sterilization are coercive, particularly for the very poor (99, 316). On the other hand, defenders of incentives point out that they provide an immediate economic benefit to the acceptors and their families as well as the long-term benefits of fertility control to the family and reduced population growth to the entire community (116, 122, 316). In 1981 the International Conference on Family Planning in the 1980s in Jakarta made

**A specially equipped bus brings vasectomy services to rural Thailand. Similar buses are also used in the Philippines and Indonesia. A less expensive alternative is a mobile team that sets up a temporary clinic in a building such as a school.** (Steven Smith)

these recommendations concerning incentives:

- Incentives should be accompanied by full availability of family planning information, education, and services.
- The effectiveness of incentives in family planning programs should be evaluated in well-designed studies.
- Cash incentives to providers and clients for the acceptance of a particular method should be restricted because they tend to distort the user's perspective and may lead to abuse (224).

### Increasing Availability

Vasectomy cannot be widely utilized until more services are available. One way to extend services involves sending mobile teams of physicians and paramedics to rural areas that lack hospitals, medical supplies, and trained physicians. In rural areas the mobile team can operate in primary health care centers, schools, or other public buildings. Alternatively, the mobile team can travel in operating vans equipped with all needed supplies—one or two operating tables, medicines, and surgical and emergency resuscitation equipment. These vans are used in the Philippines, Indonesia, and Thailand (543).

In Thailand, Community-Based Family Planning Services (CBFPS) launched a special campaign in July 1980 to promote vasectomy. Mobile teams traveled throughout rural Thailand in two vasectomy buses (see photo, this page). Two weeks before the visit of the mobile team, CBFPS staff conducted intensive one-day orientation and training programs in voluntary sterilization for local field workers. These workers then recruited potential clients in the community. Local radio stations and newspapers carried announcements. Posters and leaflets were distributed. During the first nine months of the project, 3,360 village field workers in 48 districts were trained. The rural mobile units performed 4,481 vasectomies, an average of 20 per operating day. In most of the rural districts served, the number of vasectomy acceptors during the five days of services were greater than the number performed during the entire preceding year (524).

The equipped vans are very expensive to outfit and maintain, however. Also, it is usually safer and more efficient to bring the clients to a well-equipped facility. In Colombia, a mobile vasectomy program was discontinued because of high costs and frequent cases of infection (48).

While only mobile teams can provide sterilization where populations are widely scattered and transportation and access are difficult, mobile teams usually work under difficult conditions. Field workers must prepare the population and motivate acceptors, or else the time of the mobile team is wasted. In Nepal, for example, for two weeks before the arrival of the team, family planning workers conduct an intensive publicity campaign in the villages around the proposed campsite (12). Providing follow-up care is difficult. Mobile teams should try to maintain the same standards and provide the same follow-up as stationary clinics (543), but in practice this may be difficult.

Training more physicians in vasectomy techniques and in service delivery will make services more available. Currently, AVS is sponsoring training courses in both male and female sterilization. Ongoing successful vasectomy programs such as PROPATER in Brazil are beginning to train physicians from Brazil and other countries (37). In Indonesia over 100 physicians and paramedics have been trained in a vasectomy program at Bethesda Hospital, Yogyakarta, with help from World Neighbors (399). The Pathfinder Fund, based on its experience in Asia, now recommends that urologists, general surgeons, and general practitioners receive training in vasectomy techniques, since they are more likely to offer services to men than obstetricians or gynecologists (89). It is also important that physicians who are selected for training support vasectomy. Physicians who would never undergo a vasectomy themselves are less likely to perform the operation (335).

Vasectomy services, particularly in rural areas, can be expanded when paramedics perform the procedure (46, 88, 89, 419, 510). Currently, paramedics are performing vasectomies in programs in Thailand and Indonesia (89, 228, 419). The Pathfinder Fund now recommends that the entire surgical team, not just the physician, receive training in vasectomy techniques. Thus, the assisting nurse can perform vasectomies under the doctor's supervision when the patient load is heavy (89).

While there have been no studies comparing paramedics and physicians, a recent Thai study found that medical students could perform vasectomies as safely as experienced surgeons. The students, including several women, received training in male reproductive anatomy and physiology, and they practiced surgical skills on animals. They assisted surgeons with 5 to 10 procedures and then performed at least 20 vasectomies under supervision. After the training, the performance of students was compared with that of the surgeons. Side effects were few and similar in the two groups (88).

In October 1982 AVS started a 2-year program to develop vasectomy services in developing countries. By the end of 1982 11 countries had submitted 14 proposals (37). To date about $400,000 (US) has been allocated to projects in six countries—Brazil, the Philippines, Costa Rica, El Salvador,

## Male Responsibility in Hong Kong

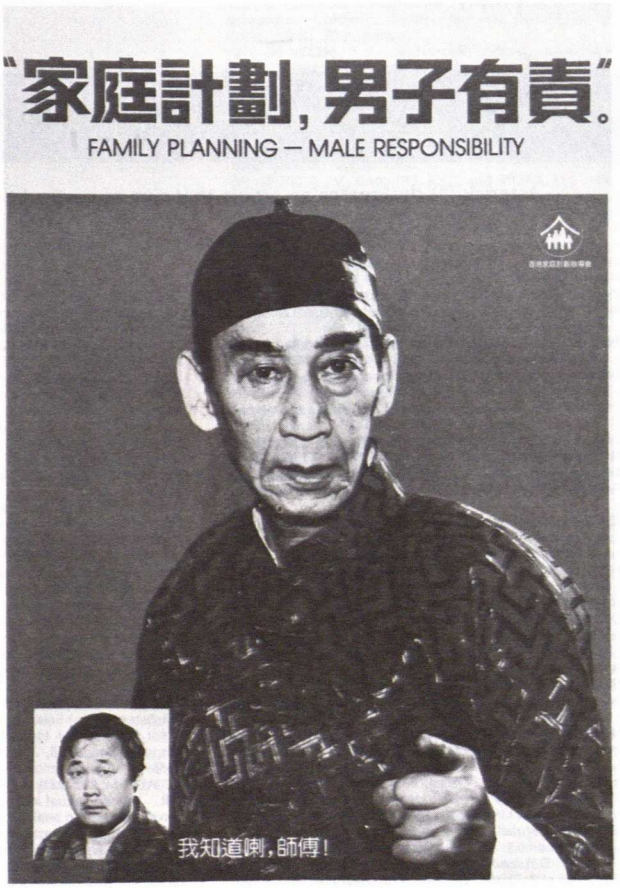
Recognizing that family planning is traditionally considered a woman's responsibility in Chinese culture, the Family Planning Association of Hong Kong (FPAHK) has long stressed the need to change this attitude. FPAHK opened its first male clinic in 1960 and the first vasectomy clinic in 1973. Through a combination of imaginative promotions and special services, FPAHK continues to involve men in family planning (149).

Since the 1970s FPAHK promotions have emphasized the masculinity of the man who takes responsibility for family planning. In the mid-1970s posters featured a strong man holding a baby (see **Population Reports**, *Update on Condoms—Products, Protection, Promotion*, H-6, September-October 1982, p. H-135). A soccer star talked publicly about his experience with vasectomy. Matchboxes bearing family planning messages were distributed to men in factories and offices. In 1977 a "Mr. Family Planning" campaign was launched. Television celebrities portrayed "Mr. Birth Control" and "Mr. Vasectomy," distributing condoms at outdoor variety shows and holding press conferences. A cartoon series, a comic book, a poster, and a TV advertisement all featured the "Mr. Family Planning" theme. T-shirts with the slogan "Wear Me" promoted condom use. In 1979, when promotional emphasis on voluntary sterilization increased, "Mr. Birth Control," "Mr. Vasectomy," and the soccer star joined a parade and appeared in TV advertisements. A well-known songwriter and singer helped produce a song promoting voluntary sterilization.

While condom use in Hong Kong has continued to grow over the last several years, the number of vasectomies has not. In fact, in 1981 only 338 vasectomies were performed—a drop of more than one-third from the previous year. Thus in 1982 FPAHK started a new campaign to emphasize male responsibility, publicize FPAHK services, and inform men about vasectomy. At first, the campaign featured a robust Chinese man in a Superman costume. Because of potential copyright problems, FPAHK switched the theme and launched a new promotional campaign in May 1983.

The central figure in the new campaign is Huang Fei-hung, in Chinese folklore a master of the martial art of kung-fu known for his righteousness, authority, and other virtues. A veteran actor and kung-fu expert who has played the role in over 100 films and series volunteered his help. On radio and TV Master Huang stresses the husband's role in family planning and the availability of male methods, especially vasectomy. Some 5,000 posters of Master Huang have been distributed to housing developments, marriage and birth registries, public transit stops, theaters, and other public places (see photo, this page). Following the mass media promotions, a series of exhibitions were held on weekends in shopping centers and public housing developments. Under colorful lamppost banners, the exhibitions featured interviews with vasectomized men, electronic displays, souvenirs, and free checkups. "Wear Me" T-shirts have been produced again. A radio series consists of talks by the FPAHK doctor and education officer, interviews with male celebrities, write-in question-and-answer sessions, and a quiz. At the request of FPAHK, a TV series produced a special episode on male responsibility for family planning, and the actor who portrays Master Huang has appeared as a guest star in other shows. A new cartoon series in a major newspaper and editorial columns have taken up the theme.

While it is still too soon to measure long-term impact on condom use or vasectomy acceptance, the new promotional campaign clearly has captured the attention of the people and the media. Attendance at the male family planning clinic during the summer of 1983 was 36 percent higher than during the summer of 1982. The number of vasectomies increased by 19 percent. Over 40 percent of these vasectomy acceptors said that the male responsibility campaign convinced them to undergo sterilization (149). FPAHK attributes this success to: (1) careful choice of a theme, (2) many different promotional methods used one after another, starting with an intensive mass media campaign, (3) innovative promotions, and (4) contributions of services from many organizations and individuals, especially in the government and the media.




**"The male should be responsible for family planning," says Master Huang, the kung-fu master who is the central figure in the new promotional campaign of the Family Planning Association of Hong Kong. "I know, Master," replies his disciple.**

Panama, and Guatemala. These projects include starting new vasectomy clinics, expanding existing services, and developing training programs for physicians (9). In Guatemala a pilot project in three rural areas will use knowledge, attitude, and practice surveys to compare the cost-effectiveness of radio announcements and interpersonal communication in providing information about vasectomy (12, 425).

In areas where vasectomy has never before been popular, programs that emphasize vasectomy are having surprising success. In February 1981 PROPATER, a private, nongovernmental, nonprofit organization, established the first outpatient vasectomy clinic in Brazil. At first, publicity for the new clinic circulated only by word-of-mouth. Within a few months doctors, social workers in a few factories, and others were told about the services, and the influx of clients increased. As of September 1982 about 1,450 vasectomies had been performed. Over 40 percent of clients had used condoms or withdrawal before coming for vasectomies, suggesting that many were already taking responsibility for family planning. At the same time, 23 percent of couples had never used any contraceptive method before. PROPATER director Marcos de Castro comments, "The success of PROPATER demonstrates unequivocally that an important segment of Brazilian men accepts responsibility for contraception and sterilization if an adequate specialized center is available" (123).

In Guatemala City, Guatemala, the Asociación Pro-Bienestar de la Familia (APROFAM) offers a range of contraceptive methods, including both vasectomy and female sterilization. Both procedures have been popular, and the annual number of acceptors is growing rapidly. In 1978 the clinic performed about 650 vasectomies; in 1980, just over 1,000; in 1982, just over 1,300 (115). While in 1980-82 one vasectomy was performed for every six female sterilizations, the ratio of male to female procedures is one of the highest of all IPPF affiliates in Latin America. In Colombia, for example, the ratio is one to 90 and in Nicaragua, one to 16 (115). APROFAM executive director Roberto Santiso and colleagues attribute the success of vasectomy to equal programmatic emphasis on male and female sterilization. Husband and wife are counseled together. Even if the couple was initially interested in female sterilization, both methods are discussed in detail and their relative advantages explained (426). Program administrators think that emphasis on information and education, primarily in individual and group counseling, is the main reason for high levels of client satisfaction (428). Presumably, these satisfied clients are recommending vasectomy to other men. Also, program personnel have positive attitudes about both male and female sterilization, and their interest and involvement in their work is maintained through training programs and close supervision (426, 428).

Currently, there are few programs like these. Their success indicates, however, how much can be accomplished by programs that make special efforts to serve men. As more programs recognize this potential and help men to change their attitudes, more men may choose vasectomy.

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