

# Characteristics of Men Receiving Vasectomies In the United States, 1998–1999

**CONTEXT:** Even though vasectomy is a popular method of contraception in the United States, there is limited information on the characteristics of men choosing vasectomy and why they decide to undergo the procedure.

**METHODS:** A nationwide, practice-based survey of 719 men receiving vasectomies was conducted between July 1998 and June 1999.

**RESULTS:** Low-income, minority and less educated men were underrepresented among vasectomy recipients. The majority of men were married or cohabiting (91%), non-Hispanic and white (87%), and educated beyond high school (81%). Only 7% of men had annual household incomes of less than \$25,000, and fewer than 1% paid for the procedure using public funding; 81% of respondents paid through private insurance or a health maintenance organization. Half of men reported choosing vasectomy over a reversible method because it is the most secure means of preventing pregnancy, and 62% chose vasectomy over tubal ligation because the procedure is simpler and safer. Doctors and nurses were the most important sources of information about vasectomy (cited by 31% of respondents), followed by wives or partners (25%) and friends (23%).

**CONCLUSIONS:** Despite the diversity of the U.S. population, vasectomy recipients are a homogeneous group. By identifying users of vasectomy and underserved groups, our findings should assist service providers and program managers in planning strategies to reduce the large difference in levels of vasectomy use among men of different races, ethnicities and income groups.

*Perspectives on Sexual and Reproductive Health, 2004, 36(1):27–33*

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The most effective methods of preventing pregnancy—female and male sterilization—are also the most widely used methods among U.S. couples.<sup>1</sup> In 1995 (the most recent year for which data are available), 39% of women aged 15–44 who were practicing contraception reported that they or their partner had been sterilized.<sup>2</sup> Still, unintended pregnancy remains a serious public health problem in the United States: In the mid-1990s, an estimated 57% of all pregnancies were either mistimed or unwanted.<sup>3</sup> Thus, an increase in sterilization rates could contribute to a reduction in the level of unintended pregnancy.

Even though vasectomy is less expensive, is less invasive and has fewer complications than tubal ligation,<sup>4</sup> tubal sterilization is the more popular method: In 1995, the proportion of women using a method who relied on female sterilization was nearly three times the proportion who relied on male sterilization (28% vs. 11%).<sup>5</sup> After increasing steadily during the 1960s and 1970s, the rate of vasectomy leveled off during the 1980s and has remained stable ever since.<sup>6</sup> For example, in both 1991 and 1995, roughly 500,000 vasectomies were performed—representing a rate of approximately 10 per 1,000 men aged 25–49.<sup>7</sup>

Despite the relative popularity of vasectomy as a family planning method in the United States, we lack information on the characteristics of men choosing vasectomy as their contraceptive method and on their reasons for undergo-

ing the procedure. However, no nationwide vasectomy surveillance system exists, and data from national health surveys are of limited use: For example, the National Survey of Men overlooks a considerable portion of men by focusing on those aged 20–39, and up to the 1995 wave, the National Survey of Family Growth (NSFG) obtained only secondary information about vasectomy, through interviews with women.<sup>8</sup>

In this study, we examined the profile of U.S. men undergoing vasectomy and factors behind their decision for doing so. This information will help administrators, service providers and other health care professionals to identify underserved populations, and to develop education programs and services for men.

## **METHODS** **Study Design**

In this cross-sectional survey, conducted from July 1998 through June 1999, a sample of providers asked men to complete a self-administered questionnaire before their vasectomy. The questionnaire contained a total of 16 questions, which gathered data on respondents' demographic characteristics, socioeconomic status, reproductive intentions, contraceptive use, method of payment, reasons for having a vasectomy and sources of vasectomy information. Written informed consent was obtained from all participants before

the survey, which was approved by an institutional review board at the Tulane University Health Sciences Center.

Our sample was drawn from a nationally representative probability sample of medical practices that had reportedly performed vasectomies according to a 1995 survey on the incidence of vasectomy in the United States.<sup>9</sup> In the original survey, the American Medical Association's Physician Master List was used to obtain a random selection of urologists, family physicians and general surgeons—the three medical specialties that commonly perform vasectomies.<sup>10</sup> The practice in which a physician reportedly spent most of his or her time was included in the sample; practices were counted only once. In all, nearly 900 practices—including those based in private offices, hospital settings, health maintenance organizations (HMOs), and community or public clinics—had performed one or more vasectomies during 1995. These practices were eligible for selection for our study.

Our survey used a stratified, one-stage cluster design, in which practices were divided into four strata by census region and subdivided into three strata by medical specialty. We randomly selected a probability sample of practices, accounting for practice size in terms of the number of vasectomies performed in 1995. Our target sample of vasectomy recipients was 1,540, which corresponded to approximately 180 practices.

Practices administered the questionnaire during one randomly assigned month (July 1998, September 1998, December 1998, January 1999, March 1999 or April 1999). We limited the study period to one month to minimize the reporting burden, and chose months on the basis of unpublished data from the National Ambulatory Medical Care Survey indicating when the demand for vasectomies was likely to be greatest.<sup>11</sup> We initially assigned 30 practices to each study month. However, because not all assigned practices participated in the first two months, we selected approximately 30 more practices for each subsequent month. Furthermore, because of nonresponse during the sixth study month, we conducted a seventh month of data collection among 60 practices, in June 1999.

### Statistical Analysis

We calculated sampling weights to account for the few larger practices that participated more than once. In addition, we used the method of weighting classes to derive stratum-specific nonresponse weights and noncoverage weights (to account for vasectomies performed by practices that were excluded from the sample because they had gone out of business or changed status since 1995). Finally, the weighted data were poststratified to control for the estimated number of males in the general population in 1995, census region of each practice and physician specialty. We used SUDAAN to estimate variance. All data are presented as weighted estimates.

To compare the characteristics of men in our study with those of the national male population, we stratified 1998 census data<sup>12</sup> of men aged 20–74 into the same demo-

graphic and socioeconomic categories as we used for the study group. We used 1998 National Center for Health Statistics data for comparison data on men's race and ethnicity, and for information on health care coverage of men in the general population, as a proxy for their method of payment for medical services, which we compared with clients' method of payment for vasectomy.<sup>13</sup> National data on reproductive intentions and contraceptive use were from the 1995 NSFG<sup>14</sup>—a survey of women aged 15–44. Hence, caution should be used in interpreting the comparisons we have made between NSFG data and those reported by vasectomy recipients. However, no other, more appropriate sources of data are available.

## RESULTS

### Response Rates

We attempted to contact a total of 347 unique physician practices that took part in the 1995 survey. We excluded 16% of them because they could not be linked to an active practice (e.g., physicians in solo practices had retired or practices no longer performed vasectomies). Differences in the proportions of excluded practices by census region and by physician specialty were not significant.

Some 46% of practices declined to participate in the study. We compared practices that took part and those that did not in terms of physician specialty, census region, practice size (based on the number of employees), setting (office versus hospital) and number of vasectomies reported in the 1995 survey. Participation was not significantly different among the three physician specialties—52% of family physicians, 45% of general surgeons and 42% of urologists. Participation by census region was also similar—about 50% each in the Northeast and West, and about 40% each in the Midwest and South. However, practices reporting the smallest and the largest numbers of vasectomies in the 1995 survey were significantly more likely to take part in our study than were practices reporting intermediate numbers.

A further 16% of practices agreed to participate but did not perform any vasectomies during their assigned month of data collection. Seventy-four practices reported performing at least one vasectomy during their assigned month; the final response rate was therefore 21%.

A total of 719 vasectomy clients completed the questionnaire—47% of the target number. The number of questionnaires returned from practices that agreed to participate was lower than expected, given the number of vasectomies that the practices reported having performed in 1995. Using the 1995 survey data, we estimated expected distributions of vasectomy clients by medical specialty and census region. Men receiving vasectomies from urologists and those undergoing procedures in the Midwest and West appeared to be overrepresented in our study: The observed proportions of men in these categories were 7–13 percentage points higher than the expected proportions. In contrast, men receiving vasectomies from family physicians and general surgeons appeared to be underrepresented, by 6–7 percentage points.

## Background Characteristics

Respondents' mean age was 36 years (range, 21–73 years). Not surprisingly, the age distributions of vasectomy recipients and of men aged 20–74 in the general population were different. Nearly two-thirds (63%) of vasectomy recipients were in their 30s, and only 7% were aged 45–74 (Table 1). In contrast, only 25% of the male population in 1998 were in their 30s, and 42% were aged 45–74.

The proportion of vasectomy clients who were married or cohabiting was larger than that of similarly aged men in the general population—91% vs. 62%. On the other hand, a lower proportion of men in the study sample than of men in the general population had never married or were separated or divorced—9% vs. 38%. Respondents had, on average, 2.5 children at the time of their vasectomy; the average age of the youngest child was 4.4 years (not shown).

Striking differences in race and ethnicity existed between men choosing vasectomy and similarly aged men in the general population in 1998. Although the majority of both vasectomy clients and U.S. men aged 25–74 were non-Hispanic whites, the proportion among clients was higher (87% vs. 75%). Furthermore, 11% of U.S. men were non-Hispanic blacks; yet only 5% of respondents were. And although men of Hispanic origin made up 10% of the male population, only 5% of respondents were Hispanic.

Overall, vasectomy recipients were more educated than the U.S. male population. About 16% of men aged 20–74 in the general population in 1998 had received less than a high school education, whereas all of the vasectomy clients had completed high school, and most (81%) had received some formal education beyond this level. Furthermore, only 25% of U.S. men held at least a bachelor's degree, compared with 48% of vasectomy recipients.

Low-income men were underrepresented among men choosing vasectomy, whereas high-income men were overrepresented. In 1998, 32% of the U.S. population reported household incomes of less than \$25,000, yet only 7% of vasectomy recipients reported this income level. In addition, 31% of men having a vasectomy reported an income of \$75,000 or more, compared with 20% of U.S. households.

## Reproductive Intention and Contraception

Nearly three-quarters (74%) of respondents reported that their most recent child had been wanted; 15% said they had not wanted their most recent child or any more children (Table 1). Similarly, 69% of U.S. women aged 15–44 reported in 1995 that they had had a wanted child in the previous five years, and 9% an unwanted one. However, some 11% of men undergoing vasectomy reported that they had wanted a child but later than when their last child was born—a proportion half of that among U.S. women (22%).

The use of contraceptive methods other than sterilization was more common among respondents than among women aged 15–44 in the general population. The majority of vasectomy clients (75%) reported that they or their partner were currently using a method of family planning, compared with 52% of U.S. women in 1995 who were not

**TABLE 1. Percentage distribution of U.S. men obtaining vasectomies in 1998–1999 and of the U.S. population in various years, by selected characteristics**

Characteristic	Men obtaining vasectomies	U.S. population*
<b>Age</b>		
20–29	15.3 (8.4–22.2)	21.1
30–34	31.5 (22.4–40.6)	11.6
35–39	31.8 (24.3–39.3)	13.0
40–44	14.4 (8.3–20.5)	12.6
45–74	7.0 (3.8–10.2)	41.7
<b>Marital status</b>		
Married/cohabiting†	91.4 (86.3–96.5)	61.6
Never-married/separated/divorced	8.6 (3.5–13.7)	38.4
<b>Race/ethnicity</b>		
Non-Hispanic white	87.2 (81.0–93.3)	74.8
Non-Hispanic black	4.5 (0.7–8.3)	11.0
Non-Hispanic other‡	3.5 (0.0–7.3)	4.5
Hispanic, any race	4.8 (0.7–8.9)	9.8
<b>Education</b>		
<high school	0.0	15.8
High school	19.3 (11.1–27.5)	32.5
Some postsecondary	32.9 (24.9–40.9)	26.3
Bachelor's degree	28.0 (20.3–35.7)	16.7
Graduate/professional degree	19.7 (12.6–26.8)	8.7
<b>Household income</b>		
≤\$24,999	7.1 (0.0–14.3)	32.1
\$25,000–34,999	15.2 (8.3–22.1)	13.2
\$35,000–49,999	20.9 (13.9–27.9)	16.0
\$50,000–74,999	25.4 (18.6–32.2)	18.6
≥\$75,000	31.4 (23.3–39.5)	20.1
<b>Intendedness of last child§</b>		
Intended	73.7 (67.5–80.0)	69.0
Mistimed	11.4 (5.2–17.7)	21.6
Unwanted	14.9 (9.1–20.7)	9.1
<b>Contraceptive use in last six mos.**</b>		
Pill/injectable/implant	31.7 (23.7–39.7)	26.7
Condom/diaphragm/IUD	51.1 (41.7–60.6)	19.7
Rhythm	6.5 (4.6–8.4)	2.3
Other	11.9 (7.9–15.9)	4.0
None	24.5 (15.7–33.4)	47.6
<b>Method of payment for vasectomy</b>		
Private insurance/HMO	80.6 (77.7–83.5)	u
Out of pocket	6.5 (4.7–8.3)	u
Other††	12.9 (10.7–15.1)	u
Total	100.0	100.0

\*Based on men aged 20–74 (age, marital status, education), men aged 25–74 (race/ethnicity), all households (income), women aged 15–44 (intendedness) and women aged 15–44 not using male or female sterilization (contraception). †Only 1.5% of respondents were cohabiting; national data based on married men. ‡Includes Asian, Pacific Islander, Alaskan Native and Native American. §For national data, intendedness of a birth in the last five years. \*\*Excluding sterilization. Percentages may total more than 100 because respondents could select more than one answer. ††Includes Medicaid and other public funding (<1%).  
 Notes: Figures in parentheses are 95% confidence intervals. Percentages for men obtaining vasectomies are weighted; unweighted N=719. u=unavailable.  
 Sources (national data): **Age**—U.S. Bureau of the Census, 2000 (reference 12). **Marital status**—Lugaila TA, 1998 (reference 12). **Race/ethnicity**—reference 13. **Education**—Day JC and Curry AE, 1998 (reference 12). **Income**—U.S. Bureau of the Census, 1999 (reference 12). **Intendedness and contraception**—Abma JC et al., 1997 (reference 8).

relying on sterilization. Respondents most commonly reported that they or their partner used nonhormonal methods (51%), and next most often reported using hormonal methods (32%). These two forms of contraception were

also the two most commonly used by U.S. women not relying on sterilization, although the order was reversed and the proportion using nonhormonal methods (20%) was much lower than that among vasectomy recipients. In addition, use of the rhythm method was about three times as common among respondents as among U.S. women (7% vs. 2%), as was use of “other” methods (12% vs. 4%).

**Method of Payment**

Roughly four-fifths of respondents (81%) used private insurance or an HMO plan to pay for their vasectomy (Table 1). By comparison, the proportion of U.S. men younger than 65 who had private health insurance or were enrolled in HMO plans in 1998 was slightly smaller (73%). However, this proportion masks large national differences by race and ethnic origin—80% of non-Hispanic white men had private health insurance, compared with 56% of non-Hispanic black men and 50% of Hispanic men.

One-fifth of respondents paid for their vasectomy out of pocket (7%) or through other sources (13%)—most commonly military medical benefits. Fewer than 1% of respondents used Medicaid or other public funding to pay for their vasectomy (not shown), whereas 8% of U.S. men younger than 65 relied on Medicaid for their health care in 1998. Again, the overall figure masks national differences by race and ethnicity—for example, the proportion of Hispanic men and non-Hispanic black men who relied on Medicaid for health care coverage was 2.5–3.5 times that of white men. Furthermore, about 18% of U.S. men had no health care coverage at all.

The method of payment for vasectomy varied by annual household income. Eighty-six percent of men with an annual household income of \$50,000 or more reported using private insurance, compared with 14% of men with a household income of less than \$25,000.

**Choosing Vasectomy**

The most common reason respondents gave for choosing vasectomy over reversible methods of contraception (cited by 50%) was that they regarded it as the most secure way to avoid having more children (Table 2). More than one-fifth (22%) of respondents said that the main reason was their or their partner’s dislike of other family planning methods. A small proportion (7%) reported that a recent unplanned pregnancy or pregnancy scare was the most important reason for having a vasectomy.

Among the reasons for choosing male over female sterilization, the most commonly cited (by 62% of men) was that vasectomy is the simpler and safer procedure of the two. An additional 14% said that it was their turn to take responsibility for pregnancy prevention. Having friends who did not have problems after their vasectomy was the main reason that 11% of respondents chose male over female sterilization. The fact that vasectomy is more affordable than tubal ligation played a minimal role.

Doctors or nurses were the most commonly reported source of information that helped men decide to obtain a

**TABLE 2. Percentage distribution of men obtaining vasectomies, by factors related to their vasectomy decision**

Factor	%
<b>Most important reason for choosing vasectomy over another method</b>	
Surest way to prevent having more children	49.9 (40.3–59.5)
Wife/partner dislikes other methods	12.3 (4.6–20.0)
He dislikes other methods	10.0 (6.0–14.0)
Vasectomy is permanent	10.0 (4.6–15.4)
Recently had an unplanned pregnancy/pregnancy scare	6.7 (1.9–11.5)
Vasectomy does not interfere with sex	5.2 (1.1–9.3)
Other	5.8 (1.6–10.0)
<b>Most important reason for choosing vasectomy over tubal ligation</b>	
Vasectomy is simpler and safer than tubal ligation	62.1 (55.0–69.2)
Felt it was his turn to take responsibility for contraception	14.0 (8.8–19.2)
Has friends who had a vasectomy and had no problems	11.4 (7.2–15.7)
Vasectomy is more affordable; wife’s/partner’s preference*	5.6 (2.4–8.8)
Other	7.1 (4.5–9.7)
<b>Most influential information source on vasectomy</b>	
Doctor/nurse	31.4 (22.3–40.6)
Wife/partner	24.7 (16.2–33.2)
Friend	23.1 (16.5–30.0)
Family	6.2 (3.1–9.3)
Newspaper/magazine/television/Internet	9.7 (3.8–15.6)
Other	5.0 (3.5–6.5)
Total	100.0

\*These two reasons were combined because proportions of respondents—1.3% (vasectomy is more affordable) and 5.7% (wife’s/partner’s preference)—were too small to be weighted separately. Notes: Figures in parentheses are 95% confidence intervals. Percentages are weighted; unweighted N=719.

vasectomy (31%), followed closely by wives or partners (25%) and friends (23%). Only 10% of respondents said that television, magazines, newspapers or the Internet were their most important information sources (the majority of these men said they depended mainly on the Internet).

Because of the homogeneity of vasectomy clients, we could not examine the association between men’s characteristics and their reasons for choosing a permanent method of contraception, reasons for choosing vasectomy over tubal sterilization and sources of vasectomy information.

**DISCUSSION**

This study provides the most complete profile of U.S. men choosing a vasectomy. Our results, which confirm findings of smaller, less representative studies,<sup>15</sup> indicate that men seeking vasectomies are typically non-Hispanic and white, well educated, married, relatively affluent and privately insured. It is clear that these men are not representative of the general male population: Minority, low-income and less educated men make up a disproportionately small share of vasectomy clients.

The large proportion of vasectomy clients who are non-Hispanic and white is consistent with 1995 NSFG findings showing that 91% of women who reported that their partner was sterilized were white.<sup>16</sup> (Although the data on race and ethnicity in the NSFG came from women, the majori-

ty of couples were of the same race or ethnicity.<sup>17</sup>) However, demographic and socioeconomic profiles among sterilized women are the reverse of those among sterilized men. For example, women who obtain a tubal sterilization tend to be less educated and less well-off than those who do not, and the proportion of sterilized women who are black is larger than the proportion who are white.<sup>18</sup> In addition, women who have undergone tubal sterilization are more evenly distributed among income levels<sup>19</sup> than are men who have had a vasectomy.

A huge gap in sterilization use exists between the sexes in the United States: The proportion of women who are sterilized is 2.5 times that of men who are sterilized (18% vs. 7%). The gap is particularly pronounced among Hispanics (22% vs. 2%) and blacks (25% vs. 1%), although it also persists among whites (16% vs. 9%).<sup>20</sup> The difference in male and female sterilization rates may be related to marital status. In our study, the majority of vasectomy clients were married or cohabiting; only 9% were unmarried. By contrast, 21–33% of women who obtain a tubal sterilization are unmarried,<sup>21</sup> suggesting that for unmarried or single women who are sexually active, vasectomy is much less feasible than tubal ligation as a contraceptive option. However, the rate of tubal sterilization is much higher than that of vasectomy among married couples;<sup>22</sup> hence, factors other than marital status play a role in the choice of sterilization method. Nevertheless, it is clear that women are more likely than men to bear the burden of ending childbearing, and they do so at some risk, given that tubal ligation is more invasive and has higher rates of complications than vasectomy. Understanding why men choose to have a vasectomy will help in efforts to address this imbalance.

Two important reasons men gave for choosing a permanent method over a temporary one were that they thought it was the most secure method of pregnancy prevention and that they or their partner disliked other methods. These reasons are similar to those reported in studies with less representative samples,<sup>23</sup> and emphasize the importance of having a range of contraceptive options. Other researchers have noted that a recent unplanned pregnancy or pregnancy scare plays a major role in the decision to choose sterilization;<sup>24</sup> however, this does not seem to be the case among the men in our study. Respondents relied on vasectomy rather than tubal ligation chiefly because of its superiority in terms of safety and simplicity; taking responsibility for pregnancy prevention was also an important consideration. Other researchers have reported similar reasons why men, women and couples choose vasectomy over tubal sterilization.<sup>25</sup> Therefore, campaigns promoting vasectomy services should highlight the permanence of the procedure, its effectiveness and the fact that it is simpler and safer than tubal ligation. Outreach efforts should also encourage men to play a role in pregnancy prevention and to protect their partner's health by avoiding tubal sterilization.

Confirming findings of other studies,<sup>26</sup> we found that health care providers, partners and friends were key sources of information that helped men decide to obtain a vasc-

ectomy. Researchers have found that men who have had a vasectomy are especially influential;<sup>27</sup> in our study, a sizable proportion of men attributed their choice of vasectomy over tubal sterilization to friends who said they had had a problem-free vasectomy. Hence, education programs aimed at increasing vasectomy rates need to reach as many people as possible—people who might some day influence a patient's, husband's or friend's decision about having a vasectomy. Posters and handouts in clinic waiting areas and procedure rooms could increase awareness of vasectomy among a wide audience at minimal cost. Women (especially low-income and minority women) should receive information on vasectomy and on how to discuss this option with their partners. Continuing medical education activities could help health care providers become good, accurate and up-to-date sources of vasectomy information; providers could also encourage vasectomy clients to share their knowledge and experiences with other men.

Peer education could be a particularly useful strategy to reach men with limited access to health care information and services. For example, low-income and minority men were underrepresented among vasectomy clients. Although disinterest in vasectomy may be one reason for these findings, these men may also lack relevant knowledge and have misconceptions about and negative attitudes toward vasectomy. Arevalo and colleagues found that white men were more aware of vasectomy and its positive benefits than were Hispanics.<sup>28</sup> Hispanics did not undergo the procedure because they were concerned about surgery on their genitals or they disliked the idea of sterilization—issues that might be addressed with additional information.

Increasing interest in vasectomy will do no good if vasectomy services are not readily available and affordable. Most of the men in our study paid for their vasectomy using private insurance, probably because vasectomy is covered by most insurance plans;<sup>29</sup> this may explain why cost was not a major deciding factor. However, low-income and minority men are less likely than others to have private health insurance; they also are less likely to have Medicaid coverage than are their female counterparts.<sup>30</sup> In addition, vasectomy services are not always available where uninsured low-income men and women go for health care.<sup>31</sup> Fewer than 25% of the nation's public clinics offer vasectomy services, and nearly 20% do not even provide referrals.<sup>32</sup> Therefore, the current health care system may inadvertently lead low-income and minority couples to choose tubal ligation over vasectomy, thereby contributing to the sterilization gap between the sexes. One effect of this gap is to increase public-sector spending because of the higher cost of tubal ligation compared with vasectomy. Efforts are needed to make policymakers and program planners in the public sector realize that vasectomy is among the most cost-effective contraceptives available.<sup>33</sup>

Haws and colleagues showed that when concerted efforts were made to increase awareness about vasectomy and to make vasectomy services accessible and affordable in the public sector, the number of procedures performed increased

by nearly 20%.<sup>34</sup> This finding provides the best evidence to date that there is indeed a demand for vasectomies among men using public-sector services. The greatest increase in the number of vasectomies was observed in clinics where all staff were dedicated to providing men with information about the procedure. Furthermore, training of nurse practitioners and physician assistants in performing vasectomies could help to increase access to vasectomy in the public sector while decreasing long-term costs of services.<sup>35</sup>

Ultimately, government assistance is needed to increase the availability and affordability of vasectomy services. In the past, minimal government funds were spent on family planning for men.<sup>36</sup> More recently, the U.S. Department of Health and Human Services has increased attention to male involvement in family planning and reproductive health, and has increased public spending (through Title X) on such programs. The major emphasis, however, has been on reaching male teenagers and young adults—a population unlikely to be interested in vasectomy for at least a decade or two.<sup>37</sup> Public-sector programs should seek government funding of projects to assess knowledge of and attitudes toward vasectomy among low-income and minority men, to develop outreach strategies and to increase access to quality vasectomy services through provision of vasectomies and effective referrals.

Certain limitations in the data should be recognized. Fewer than one-quarter of practices participated, and fewer than half of the target number of vasectomy recipients completed the questionnaire. These response rates were lower than expected because practices may have performed fewer vasectomies in 1998–1999 than in 1995, and because of a lack of interest in study participation among vasectomy clients (we have no information on men who declined to take part). As a consequence of the low response rate, distributions of vasectomies performed in 1998–1999 by physician specialty and census region differed somewhat from those of vasectomies performed in 1995. Although we are not aware of any systematic differences between the distributions, which would be a source of bias, we cannot rule out the existence of such differences. Furthermore, practices reporting the smallest and the largest numbers of vasectomies in 1995 were significantly more likely to have agreed to participate than those performing more moderate numbers. Although there are no obvious reasons why characteristics of the vasectomy clients would vary according to the number of procedures a practice performs, we cannot rule this out as a source of bias. Finally, for study months, we chose months in which the most vasectomies were typically performed in the past. Although characteristics of men receiving vasectomies in nonpeak months might differ from those of men receiving vasectomies in peak months, we believe this is unlikely.

## CONCLUSION

Our study clearly demonstrates that despite the diversity of the U.S. population, men choosing vasectomy are a fairly homogeneous group. Underutilization of vasectomy by

low-income and minority men most likely reflects their lack of relevant information and services. By identifying users of vasectomy and underserved groups, our findings should assist service providers and program managers in planning strategies to increase access to accurate information and quality vasectomy services in the public sector. Doing so may help to reduce the large difference in levels of vasectomy use among men of different races, ethnicities and income groups, as well as to close the gap in male and female sterilization rates.

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#### Acknowledgments

The authors thank Jeanne M. Haws, Maureen McKenzie and Lisa M. Koonin for their participation in the development, conduct and analysis of the survey; Alisa Jenny and Torri Ross for their assistance with data collection and entry; and Sani Chehimi for her assistance in the preparation of this manuscript. The research was supported by the Association of Schools of Public Health, Centers for Disease Control and Prevention, and Agency for Toxic Substances and Disease Registry through a cooperative agreement with the Tulane University School of Public Health and Tropical Medicine. The opinions expressed in this manuscript are solely the authors'.

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