

Why Are U.S. Women Not Using Long-Acting Contraceptives?

By Koray Tanfer, Susan Wierzbicki and Betsy Payn

Context: *Given the level of unintended pregnancy in the United States, it is somewhat surprising that hormonal implants and injectables—methods that are long-acting, reversible, highly effective and convenient—have not attained the popularity enjoyed by other medical methods. Knowing the reasons why women have so far spurned these methods might lead to the design and implementation of interventions and targeted social marketing to promote their use.*

Methods: *Data from the 1993 and 1995 rounds of the National Survey of Women are used to examine the reasons women gave for not having used the implant or injectables, whether they intended to use these methods and how their attitudes toward them may influence their decision to use such methods in the future. Logistic regression models were used to identify the social and demographic characteristics that influence women's decisions not to use these methods.*

Results: *Fewer than 2% of women who were at risk of an unintended pregnancy in 1995 were using the implant, and under 3% were using the injectable. Women gave three major reasons for not using either of these methods: lack of knowledge; fear of side effects or health hazards; and satisfaction with the method they were currently using. Age, education, marital status, parity and current contraceptive method strongly predicted fear of side effects, lack of knowledge and satisfaction with the current method as reasons for not using the implant or the injectable. For example, women aged 30 or older and those with a college education were half as likely as younger women and those with no college education to mention fear of side effects as their main reason for not using the implant. Likewise, single women, women with one or more children and those using a barrier method were 2–3 times as likely as married women, childless women and those using a medical method to attribute nonuse to the implant's side effects. Few women said they intended to use these methods in the next 12 months: 5% for the implant and 10% for the injectable. Single women, women with no college education, women with children, women wanting to have a child (or another child) and women with positive attitudes toward the effect of using an injectable were significantly more likely to say they intended to use the injectable. Nevertheless, substantial proportions of women reported quite negative attitudes about these methods.*

Conclusions: *The low prevalence of use and the low level of use intention for the implant and for injectables raise questions about the promise for the future of these methods. Each method seems to appeal to certain subgroups of women, however. Thus, if proper interventions and social marketing are targeted to such groups, they may be disabused of misperceptions regarding these methods and possibly become more willing to try them.*

Family Planning Perspectives, 2000, 32(4):176–183 & 191

By the late 1980s, pill use was tapering off,¹ the IUD was no longer being produced in the United States,² diaphragm use was at half the level it had been in 1960³ and sterilization was becoming many couples' primary method of contraception.⁴ All of these developments suggested that there might be some demand in the United States for a new approach to contraception. Norplant, a long-lasting and highly effective hormonal implant, was introduced in the United States in 1991, following a protracted clinical trial and approval process. It was accompanied by a well-documented record of safety and acceptance in developing countries among a range of cultures and demographic groups.⁵ The same

year, an injectable progestin, depot-medroxyprogesterone acetate (marketed as Depo-Provera), was approved and marketed. The injectable also had a formidable record of success and acceptance among different social and demographic groups in developing countries.⁶

Yet neither of these two new contraceptives ever took off in the United States. In 1995, three years after their introduction, 1% of women of childbearing age reported using the implant and 2% injectables.⁷ The low level of adoption of these two long-acting methods is somewhat surprising, for several reasons. That one-half of pregnancies in the United States are unintended alone suggests a need for better methods of contraception.

Additionally, the unpleasant side effects, inconvenience and use-failure rates of most commonly used reversible contraceptives reduce their appeal. For example, while the condom has no side effects, most men dislike using it, and the method has a failure rate of 12–15%. The pill has a very low failure rate, yet some women are averse to using it because of its association with the risk of cardiovascular problems and breast cancer, and with side effects such as nausea and headaches.

Moreover, because of its health risks and ensuing litigation, the IUD has all but disappeared from the market in the United States, despite a modest comeback effort under the auspices of the Population Council. Thus, one would expect a reversible method that combines effectiveness, convenience and safety to have received a more enthusiastic welcome.

It is important to know why women appear to have spurned these two contraceptives. Evidence suggests that the more types of contraception that are available, the lower the rate of unintended fertility will be.⁸ Therefore, it is possible that making new types of safe and convenient contraceptives available might curtail the number of unintended pregnancies, which now comprise one-half of all pregnancies in the United States.⁹

Why then have these two methods failed to attain the popularity of other widely used medical and barrier methods? Were women frightened by widespread negative publicity about the implant's side effects and its potential for coercive use? Did its high up-front cost and the need for a surgical procedure reduce its attractiveness? Or were women so satisfied with the methods they were

Koray Tanfer is a senior research scientist and Betsy Payn is a researcher at Battelle, Centers for Public Health Research and Evaluation (CPHRE), Seattle. At the time this research was conducted, Susan Wierzbicki was a researcher at CPHRE; she is currently a Ph.D. candidate in the Department of Sociology, University of Washington, Seattle. The research described in this article was supported by the National Institute of Child Health and Human Development (NICHD), under grants R01-HD-26631 and R01-HD-29616. The views and opinions expressed in this article do not necessarily reflect the views and opinions of the NICHD or the Battelle Memorial Institute.

using that they have little or no motivation to switch?

An answer to these questions could be very important. If U.S. women are not using the hormonal implant and the injectable because these methods' cost, efficacy or side effects render them inferior to existing birth control methods, demand for a new contraceptive may yet exist in the United States. But if U.S. women are not adopting the implant or the injectable because they are content with their current mode of contraception or because they do not want to practice contraception, then there may be little unmet demand for new methods.

The Implant and the Injectable

Both the implant and the injectable use a synthetic progestin to inhibit ovulation. The implant consists of six match-sized tubes that are surgically implanted into the upper arm. The tubes release progestin continuously over five years; fertility returns promptly once they are removed. The injectable is administered every three months in the arm or buttocks; fertility returns several months after injections stop. The implant and the injectable are both extremely effective, with first-year failure rates of 0.2% and 0.3%, respectively.¹⁰

Over the long run, these two methods cost roughly the same, but the initial cost of the implant is rather high (about \$500–\$700), while the injectable costs about \$140 annually. Both methods require a visit to a health-care provider. In addition, each can have unpleasant side effects. Women using the implant commonly experience irregular periods, with no bleeding, less bleeding, spotting, longer bleeding or heavier bleeding.¹¹ Other side effects of the implant include headache, acne, nausea, weight gain, breast pain, nervousness, dermatitis, change in appetite, ovarian enlargement and abnormal hair growth or loss.¹² The incidence of side effects appears to decrease over time as the progestin dosage levels off.

The injectable's most common side effects are irregular periods, more days of light bleeding or spotting, and amenorrhea. Headaches, fatigue and dizziness can also occur, although apparently at no higher rates than with other forms of hormonal contraception.¹³ Women using the injectable tend to gain an average of 5.4 pounds during the first year, rising to 13.8 pounds after four years of use.¹⁴

Research on beliefs about the injectable among U.S. women attending urban family planning clinics shows that some women still need more information about

the method.¹⁵ For example, only about one-half of the sample of injectable users thought that injectables caused menstrual changes, underestimating a common-place side effect of this method. Yet women using other methods frequently overestimate the short-term and long-term side effects of the injectable.

Research on U.S. women's beliefs about the implant showed that many women who had received contraceptive counseling at clinics but who chose methods other than the implant harbored misconceptions about the severity of the implant's side effects.¹⁶ For example, more than one-third of these women believed use of the implant would make it more difficult to conceive in the future. Furthermore, 29% feared long-term health problems, and 21% were concerned about harm to future babies. These rates were all significantly higher than those among women who were using the hormonal implant.

Finally, the implant's U.S. introduction had a unique political aspect. Some politicians and judges seized on the availability of the implant as a potential means of ensuring that poor teenagers or neglectful mothers stayed on long-acting contraception. These actions caused an outcry among women's groups and civil liberties organizations, and the method quickly became associated with race and class and with coercion. A recent study among low-income implant users in the United States found that negative publicity had had a modest effect on discontinuation, but that *demand* for the implant declined rapidly after it received widespread coverage in 1994.¹⁷

Methodology

Data

The data used in this article were obtained from the National Surveys of Women (NSW), which were conducted in three waves in 1991, 1993 and 1995. The total sample of the NSW comprises two subsamples of women. Women in the first subsample initially were interviewed in 1983, when they were 20–29 years old and had never been married. These women were reinterviewed in 1991 (N=929, for a reinterview rate of 71%). The second subsample was obtained from a new area-probability sample of 20–27-year-old women, regardless of their marital status (N=740, with a response rate of 76%).

Thus, the combined sample consists of 1,669 women who were 20–37 years old in 1991. Both samples were based on multistage, stratified, clustered area-probability designs. The black population was

oversampled to ensure statistically adequate representation. The 1991 NSW sample was revisited first in 1993 and again in 1995; we were able to reinterview 1,093 (65%) and 994 (60%) of the 1991 sample of women, respectively.

The 1991 sample was weighted to account for differential selection probabilities, oversampling and nonresponse. The 1993 and 1995 samples were weighted to account for differential panel attrition. While the weighting of the samples allows us to generalize findings to U.S. women at these ages, marriage selection and selective sample attrition might affect the combined sample. Since the 1983 sample of women had never been married at the time, marriage bias may influence the extent to which results obtained from this portion of the sample can be generalized to all women. The selective delay of marriage can affect certain attributes of the women that may be directly associated with contraceptive behavior. For example, women who postpone marriage may also be more likely to postpone childbearing. Consequently, their fertility and contraceptive behavior are likely to differ from that of women who marry early. The potential marriage selection bias among the older women and the effects of differential panel attrition over time should be taken into account when inferences are made from the sample to the population.

Sample characteristics indicate that the 1993 and 1995 samples are generally similar (Table 1, page 178). More than three-quarters were white, and about one-quarter were younger than 25 in 1991; regional distributions did not differ from 1993 to 1995. By 1995, the women were slightly more likely to be currently married, somewhat more likely to have at least a college education and more likely to have had two or more children. In addition, by 1995, respondents were substantially more likely to want no more children and to be no longer at risk of pregnancy (mainly because of sterility).*

Conceptual Approach and Measurement

We take an expectancy-value approach in this article and assume that when a woman must make a behavioral choice, she will select the alternative that is likely to lead to the most favorable outcome. Therefore, for a woman to choose a long-acting reversible contraceptive she must be in need of contraception (sexually ac-

*These differences are in large part due to changes in the status of respondents (e.g., graduation, marriage or childbirth) during the period between surveys, rather than to changes in the composition of the sample.

Table 1. Percentage distribution of U.S. women aged 20–37 in 1991, by selected social and demographic characteristics, 1993 and 1995 National Surveys of Women

Characteristic	1993 (N=1,093)	1995 (N=994)
Race/ethnicity		
White	78.4	75.1
Black	16.6	16.2
Hispanic	5.0	8.7
Age (in 1991)		
20–24	23.4	26.3
25–29	40.7	38.4
≥30	35.9	35.3
Marital status		
Currently married	48.6	53.6
Never-married, cohabiting	10.8	8.0
Never-married, not cohabiting	29.2	25.8
Formerly married	11.4	12.6
Education (in 1991)		
<high school	39.4	34.3
Some college	30.7	31.2
≥college	29.9	34.6
Region		
Northeast	20.0	19.7
South	30.6	32.7
Midwest	34.6	34.5
West	14.8	13.1
Parity		
0	44.3	36.5
1	23.0	23.9
≥2	32.7	39.7
Desire for more children		
Want more	50.2	38.1
Want no more	49.8	61.9
Contraceptive need status		
Not at risk of pregnancy	35.6	46.0
Not sexually active	10.3	11.3
Sterile/partner sterile	19.0	25.0
Pregnant/postpartum	4.2	6.1
Trying to become pregnant	2.1	3.6
At risk of pregnancy	64.3	54.1
Not using a method	17.0	15.1
Using a method	47.3	39.0
Pill/IUD	27.0	20.2
Implant/injectable	1.4	2.0
Condom	15.7	12.7
Other	3.2	4.1
Total	100.0	100.0

tive, fecund and not wanting a baby), be discontent with her current contraceptive method (including no method), believe that switching to a long-acting method will be instrumental to attaining her goal

of preventing a pregnancy and believe that a particular method is most likely to lead to the best outcome. These needs and attitudes affect behavioral intention, which is the most important determinant of behavior.

Given this conceptualization of the problem, we confine our analysis to sexually active women who are not sterile, who are fecund and who are not pregnant or trying to become pregnant. These women constitute a potential pool of users of long-acting contraceptives. Three variables are available to measure the need for contraception: current parity (with higher parity positively associated with a need for effective contraception), intention to have another child in the future and a scale of pregnancy disutility.*

We use current contraceptive method as a proxy for method satisfaction, based on the assumption that behavior reveals preference: If a woman continues to use a particular method, she must be relatively satisfied with it. The measures of attitudes toward the implant and the injectable were based on a six-item, five-point scale.† The respondents' intention to use the implant and the injectable was based on their self-reported likelihood of using either method in the next 12 months.

Results

Implant and Injectable Use

In 1993, only 1.2% of all women in the sample reported currently using the implant; by 1995, this proportion had shrunk to 0.9%. (This proportion is the same as that seen in the 1995 NSFG among women aged 15–44 who reported the implant to be their current method.18) Injectable use was also very low (1.2%) in our sample in 1995: It was slightly lower than the level reported in the 1995 NSFG (1.9%). When we confined the sample to women who were at risk of an unintended pregnancy, the proportions using the implant were 1.8% in 1993 and 1.7% in 1995, while injectable use was reported by 2.8% of at-risk women in 1995.

With such low rates of use, it is difficult

to reliably distinguish the characteristics of users from those of nonusers. While our primary focus here is on nonusers and their reasons for not using the implant or the injectable, a brief description of the users is helpful for a full understanding of the nonusers' perspective.

In 1993, implant use appears to have been relatively more prevalent among women who were young (2.6%), who did not have a college degree (2.7%), who were formerly married (9.6%), who were Hispanic (2.8%), who were Catholic (3.2%), who had two or more children (5.6%) and who did not want any more children (4.0%). Between 1993 and 1995, implant use either declined or remained unchanged across most categories of individual characteristics. The main exception was among Hispanic women, whose reliance on the implant doubled (to 6.0%).

The use pattern for the injectable more or less mirrored that for the implant, with two exceptions. Unlike the implant, injectable use was more prevalent among black women (5.8%) and among women who had attended college but who did not have a college degree (5.6%). The injectable was also popular among formerly married women (11.5%), and the increase in injectable use among this group seems to have occurred at the expense of the implant, the use of which declined from 10% in 1993 to 4% in 1995. The injectable seems also to be relatively widely used among women who live in the West.

Reasons for Nonuse

In both the 1993 and 1995 surveys, women were asked why they did not use the implant, and in 1995 why they did not use the injectable.‡ In 1993, the three major reasons for not having used the implant were women's knowledge (i.e., not having heard of it or not knowing enough about it), satisfaction with their current method and fear of the method's side effects (or other medical reasons).

Two years after the implant's introduction, more than one-fourth of the women in our sample had not heard of it,

*In 1993, pregnancy disutility was measured on a five-point scale, ranging from "strongly agree" to "strongly disagree," for the following five items: A pregnancy would bring joy to my life; a pregnancy would cause me emotional difficulties; a pregnancy would interfere with my education or my work; I would experience financial strain if I became pregnant; and a pregnancy would totally disrupt my life. The measure is the sum of the scale scores of the five items, ranging from -10 to +10. In 1995, the first item in the pregnancy disutility scale (a pregnancy would bring joy to my life) was dropped from the scale, and therefore the scale score

for that year runs from -8 to +8.

†Attitudes toward the implant in 1993 were measured with six questions using a five-point scale, ranging from agreeing strongly with the first phrase to agreeing strongly with the second. The six questions ran as follows: "Would your using Norplant in the next 12 months be: good or bad? difficult or easy? healthy or unhealthy? comfortable or uncomfortable? necessary or unnecessary? expensive or inexpensive?" Each item was coded so that the most positive response got five points, then the items were summed. We used the same

approach to coding attitudes toward the injectable in 1995. However, in 1995, the scale contained the following seven questions: "Would your using Depo-Provera in the next 12 months be: good or bad? painful or not painful? difficult or easy? healthy or unhealthy? convenient or inconvenient? expensive or inexpensive? effective or ineffective?"

‡Women who were sterile, women who were pregnant or postpartum, women who were trying to become pregnant and women who were not sexually active were not asked these questions.

and another 5% said they did not have enough information about it (Table 2). By 1995, the proportion reporting "lack of knowledge" had declined to 9%.^{*} Both in 1993 and in 1995, more than one in four women said they were not using the implant because they were satisfied with the method they were using and did not see a need to switch. Fear of the implant's side effects was the third most frequently reported reason in 1993. The proportion of women citing "fear" as their main reason for not using the implant had nearly doubled by 1995, however, undoubtedly as a result of the negative publicity it had received in the print and electronic media between the two surveys. Surprisingly, despite the rather high up-front cost of the implant, only a small proportion of women offered cost as a reason for not using it.

The reasons women gave for not using the injectable are not very different from the reasons they gave for not using the implant. In 1995, more than one-third of the women in our sample either had not heard of the injectable method or did not know enough about it to consider it for use. Roughly one-fifth of the women were satisfied with their current method and did not consider switching methods. Fear of the method's side effects was the third most frequently cited reason for not using the injectable (mentioned by 17%); this was only slightly lower than the percentage who gave "fear" as their reason for not using the implant.

Among women in our sample, reports of side effects among the small group of users of these two methods were commonplace (data not shown). Implant users complained of irregular periods, heavier bleeding, mood swings and depression. Women who reported side effects were also highly likely to report intending to have the implant removed before its five-year period of effectiveness was over: Roughly one-half of the users who reported side effects in 1993 said they were likely to have the implant removed within the next 12 months.

Women using the injectable were even more likely than implant users to report side effects, although they were less likely to describe them as major. Among the side effects that they cited were irregular periods, weight gain and amenorrhea. In contrast to implant users, however, these women were unlikely to report any intention to discontinue using the injectable: Fewer than 5% of users who reported side effects said they would stop using the injectable within the next year. As one

would expect, the few former users of these methods in our sample were more likely to complain about the side effects than were current users.

The data in Table 2 suggest that there is ample room to increase use of these methods, if potential users were properly targeted and if interventions were designed to increase women's knowledge and to dispel their misperceptions about these methods. While most women in the sample can be considered potential candidates for future use of these methods, we focused on three groups in particular: those who professed a lack of knowledge of the methods; those who reported being satisfied with their current contraceptive method (including those who were not using any method at that time); and those who were afraid of the methods' side effects.

We performed a multivariate analysis of the effect of women's individual characteristics on their likelihood of having said in 1995 that lack of knowledge, satisfaction with their current method or fear of side effects were their reason for not having used the implant (Table 3, page 180).[†] Older women (those aged 30 or older) and those with a college education were half as likely as younger women and women with no college education to give fear of side effects as their main reason for not using the implant. Single women, women who had one or more children and women who were using a barrier method were 2-3 times as likely as married women, childless women and those using a medical method to cite fear of the implant's side effects as the main reason for not using it. Women who were using no method were marginally ($p < .10$) more likely to give fear as a reason for not using the implant than were users of a medical method.

In addition to the main effects, two significant interactions influenced the model predicting fear of side effects as a reason for not using the implant: an interaction between education and parity, and one between marital status and current contraceptive method. Women who had no college education and no children were significantly more likely to fear the side effects of the implant than were women

Table 2. Percentage distribution of U.S. women aged 21-37 in 1991, by main reason given for not using implant or injectable, according to year

Reason	Implant		Injectable
	1993 (N=702)	1995 (N=546)	1995 (N=529)
Has never heard of method	28.1	na	9.1
Lacks knowledge	4.9	9.3	27.0
Is satisfied with current method	26.7	28.1	20.6
Wants short-term method	3.2	3.2	1.3
Fears method	12.0	22.0	17.0
Has medical reasons	2.4	2.1	3.1
Method costs too much	3.5	2.3	1.9
Has no interest/does not know	5.5	12.2	6.9
Does not use contraceptive	5.0	7.0	3.2
Other/has no need in general	8.8	13.7	10.0
Total	100.0	100.0	100.0

Notes: Question about reasons for using the injectable was not asked in 1993. na=not applicable.

who had no college education but who had one or more children. Similarly, married women who were using a barrier method were more likely to cite fear as a reason for not using the implant than were married women who were using a medical method.

Satisfaction with their current method was an important reason why women were not using the implant in 1995; this reason was significantly more likely to be reported by women who used medically prescribed methods than by users of any other method (including no method). Married women, women with a college degree, women who had no children and women who did not want any more children were also significantly more likely than their comparison groups to report satisfaction with their current method as the primary reason why they were not using an implant.

There were also strong interactions between education and parity and between marital status and contraceptive method in the model of satisfaction. While barrier method users were less likely to be satisfied with their current method than were users of medical methods, married women who used a barrier method were

^{*}In 1995, unlike in 1993, women were not asked if they had ever heard of the implant; however, women who gave it as a reason for not using the implant are included in the "lack of knowledge" group.

[†]We present results that are significant at $p < .10$ when the coefficient (or the odds ratio) is considerably large and stable. While this is not the common practice, there are two reasons for retaining these in the models. First, doing so has a reinforcing effect that either enhances the effects of other variables or reduces the suppressing effects of other variables in the model. Second, we believe that with a larger sample, these statistics would most likely have attained statistical significance at more stringent levels of probability. Moreover, we feel it is important not to ignore such statistics when available evidence is sufficiently convincing to reject a chance occurrence (Type I error).

Table 3. Odds ratios from logistic regression models showing likelihood that selected characteristics affected women's reasons in 1995 for not having used the hormonal implant, by reason

Characteristic	Fear	Satisfaction	Knowledge
MAIN EFFECTS			
Race			
Black	0.75	1.12	1.32
White	1.00	1.00	1.00
Age			
<30	1.00	1.00	1.00
≥30	0.53*	1.46	0.61
Marital status			
Single	1.90*	0.20**	0.25*
Married	1.00	1.00	1.00
Education			
<college	1.00	1.00	1.00
≥college	0.40*	4.41**	0.32†
Parity			
0	1.00	1.00	1.00
≥1	2.90**	0.39*	1.80
Desire for children			
Wants more	na	0.34*	0.86
Wants no more	na	1.00	1.00
Method currently used			
Medical method	1.00	1.00	1.00
Barrier method	2.25**	0.19***	3.80†
No method	1.70†	0.04***	2.98
INTERACTION EFFECTS			
Marital status & method use			
Married X medical method	1.00	1.00	na
Married X barrier method	3.66*	1.93*	na
Education & parity			
<college X 0	2.79*	0.36*	na
<college X ≥1	1.00	1.00	na
Education & desire for children			
<college X wants more	na	3.87	na
<college X wants no more	na	1.00	na
Age & education			
≥30 X <college	na	na	4.80*
≥30 X college	na	na	1.00
Marital status & parity			
Single X 0	na	na	3.98†
Single X ≥1	na	na	1.00
Age & method use			
≥30 X medical method	na	na	1.00
≥30 X barrier method	na	na	3.18
≥30 X no method	na	na	7.42†
-2 log likelihood	441.5	446.8	272.2
Chi square (df)	28.9(10)***	85.1(12)***	18.4(12)†
N	437	437	437

*p<.05. **p<.01. ***p<.001. †Marginally statistically significant, at p<.10. Notes: ref=reference category. na=not applicable.

more likely to give method satisfaction as their reason for not using the implant than were married women who used a medical method. Similarly, the effect of education on satisfaction with the current method was mediated by the effect of parity and whether the women wanted another child.

The proportion of women who reported lack of knowledge as a reason for not using the implant was much smaller in

1995 than in 1993. The very skewed distribution of knowledge as a reason for not using the implant hinders statistical modeling efforts; consequently, coefficients often do not attain statistical significance, despite seemingly large differences. Nonetheless, we find that married women are four times as likely as single women to report insufficient information about the implant as a reason for not using it. Also, older women who have not gone to college are more likely to be less informed than those who have a college education (that is, while knowledge increases with age, not having a college education wipes out the age effect).

Two main effects did not attain statistical significance at traditional levels (p<.05), but are strongly suggestive of actual differences: current method and education. College-educated women and women who were using a medical method were less likely to cite lack of knowledge as a reason for not using the implant than were women with no college education or those who used a barrier method.

In addition, a pair of interaction effects—between marital status and parity and between age and contraceptive method—were marginally significant (p<.10). While single women overall were less likely than married women to cite lack of knowledge for not using the implant, single women with no children were more likely to give lack of knowledge as a primary reason. Likewise, the effect of age was mediated by the method women were actually using. Again, the knowledge model was weaker than the other two because of the highly skewed distribution of this reason

among women who were not using the implant.

Multivariate analyses indicate that in 1995, white women, single women, college-educated women, women with one or more children and women using a medical method were significantly more likely than black women, married women, those with less than a college education, childless women and those using no method to report fear of side effects as their primary reason for not using the injectable (Table 4). Additionally, interactions suggest that white women who did not want another child, married women who wanted a child and women who did not have a child and wanted to have one were all more likely to give fear as a reason for not using the injectable. The strong education effect appears to be mediated by a stronger effect of the type of method that was being used: Women who had less than a college education were more likely to cite fear as a reason if they were not using any method than if they were using a medical method.

Satisfaction with their current method was cited as the primary reason for not using the injectable more among college-educated women, women who did not want another child and women who were using a medical method. To a lesser degree, single women and women who had children also were more likely to give satisfaction with their current method as the reason for not using an injectable method. Any effect of race was reduced by an interaction with marital status, as white single women were less likely than white married women to not use the injectable because they were satisfied with their current method. Similarly, the effects of marital status (being single) and parity were reduced by the method being used (barrier vs. medical), and the effect of wanting a child was mediated by education. Women with less than a college education were generally less likely to give satisfaction with their method as a reason for not using the injectable—unless they also wanted to have a child, in which case they were more likely to cite satisfaction with their current method than were women who did not want a child.

Three years after the injectable's introduction, a large proportion of the women who were surveyed either had not heard of it or did not know enough about it to be able to choose it as their method. Women younger than 30, women who had no children and women who were using a medical method were more likely to report lack of knowledge or insuffi-

cient information about the method as a reason for not using the injectable. When we added interaction effects to the model, the effect of current method was altered both by education and by marital status, such that when education (less than college) or marital status (married) were held constant, women who were not using a medical method were significantly more likely to mention lack of knowledge as a primary reason than were women using a medical method.

Outlook for Future Use

What does the future hold for these two long-acting contraceptives? We examine here the attitudes of women toward using the implant or the injectable in the future, and their intention to use either of these methods within the 12-month period following the survey.

Use Intention

Intention is considered to be the most important determinant of behavior.¹⁹ Therefore, despite the low level of current use of these methods, examining use intention might be helpful in differentiating groups to whom these methods could be promoted.

In 1991, among all women who had heard of the implant, one-third said they would use it if it were available.²⁰ This was a very optimistic projection of use intention, in part because of the novelty of the method and in part because the question wording was inherently ambiguous. Notwithstanding the ambiguity of the intention question in 1991, the proportion of women who said they intended to use the implant has declined since then, to nearly 8% in 1993 and to 5% by 1995.²¹ In contrast, women's intention to use the injectable increased from 5% in 1993 to 10% in 1995.²²

The distributions of intention to use these methods by relevant social and demographic characteristics reveal very few and rather small differences among women who intended to use either of these methods in the 12-month period following the survey (Table 5, page 182). Yet a decline in the intention to use the implant between 1993 and 1995 was almost universal, whereas intention to use the injectable increased in almost every group during the same period.

There are several possible reasons why the implant's appeal has changed since its introduction. First, the drop in use intention may be a survey artifact. Differential sample attrition between 1991, 1993 and 1995 may be responsible for part of this

seemingly substantial change. Women who were missed in the follow-up interviews were more likely to be black, young, single and less-educated, and were less likely to use any contraceptive method. These same characteristics were positively associated in 1991 with the intention to use the implant.²³ However, a comparison of the three samples on women's use intentions showed no significant differences. Therefore, we ruled this out as a possible cause of the decline in use intention.

As we mentioned earlier, the wording of the use intention questions in the 1993 and 1995 surveys was more explicit than in 1991, and the questions in the later surveys had a short and finite reference period. While this may have been responsible for part of the decrease in the intention to use the implant, the continuation of the decline from 1993 to 1995 implies that other external causes may be responsible.

There are three other plausible reasons why the implant may have lost appeal. In the follow-up surveys, a greater proportion of women knew of the implant and knew more about it. It is possible that as women became more aware of the implant's cost and side effects, they also became less willing to use it. In addition, this unwillingness may have been exacerbated by negative publicity about the implant in the media, following suggestions of coercive or punitive use of implants, cases of insertion and removal

Table 4. Odds ratios from logistic regression models showing likelihood that selected characteristics affected women's reasons in 1995 for not having used the hormonal injectable, by reason

Characteristic	Fear	Satisfaction	Knowledge
MAIN EFFECTS			
Race			
Black	0.18*	0.38	1.17
White	1.00	1.00	1.00
Age			
<30	1.00	1.00	1.00
≥30	0.81	0.86	0.60*
Marital status			
Single	6.90***	4.85†	1.29
Married	1.00	1.00	1.00
Education			
<college	1.00	1.00	1.00
≥college	3.27**	2.53*	1.84
Parity			
0	1.00	1.00	1.00
≥1	2.97*	1.88†	0.43*
Desire for children			
Wants more	na	0.37*	na
Wants no more	na	1.00	na
Method currently used			
Medical method	1.00	1.00	1.00
Barrier method	1.78	0.09***	0.24*
No method	0.14*	0.04***	0.25*
INTERACTION EFFECTS			
Race & desire for children			
White X wants more	0.15**	na	na
White X wants no more	1.00	na	na
Marital status & desire for children			
Married X wants more	2.95†	na	na
Married X wants no more	1.00	na	na
Parity & desire for children			
0 X wants more	5.06**	na	na
0 X wants no more	1.00	na	na
Education & method use			
<college X medical method	1.00	na	1.00
<college X barrier method	na	na	4.99**
<college X no method	10.70**	na	5.52**
Education & parity			
<college X 0	na	na	1.00
<college X ≥1	na	na	2.12
Race & marital status			
White X single	na	0.14*	na
White X married	na	1.00	na
Education & desire for children			
<college X wants more	na	3.84**	na
<college X wants no more	na	1.00	na
Marital status & method use			
Married X medical method	na	1.00	1.00
Married X barrier method	na	5.21*	3.22*
Married X no method	na	na	3.33*
Parity & method use			
0 X medical method	na	1.00	na
0 X barrier method	na	2.88†	na
-2 log likelihood	364.5	413.0	545.7
Chi square (df)	49.3(11)***	69.7(12)***	16.8(12)†
N	435	435	435

*p<.05. **p<.01. ***p<.001. †Marginally statistically significant, at p<.10. Notes: ref=reference category, na=not applicable.

Table 5. Percentage of U.S. women aged 21–37 in 1991 who said they intend to use the implant or the injectable at some time in the next year, by selected social and demographic characteristics, according to year of survey

Characteristic	Implant		Injectable	
	1993 (N=884)	1995 (N=745)	1993 (N=898)	1995 (N=756)
Total	7.6	5.1	4.6	10.2
Race/ethnicity†				
White	7.5	4.8	3.2	6.3
Black	8.3	7.2	5.4	15.3
Hispanic	6.7	3.3	13.0	20.6
Age†				
20–24	9.9	4.8	7.6	12.7
25–29	7.1	6.3	2.0	6.9
≥30	6.3	4.0	3.7	6.7
Marital status‡				
Currently married	7.4	4.6	4.1	6.5
Formerly married	11.2	8.8	6.3	15.1
Never-married	7.2	4.6	3.6	10.2
Education‡				
≤high school	6.7	8.4	6.6	9.2
Some college	8.3	3.9	2.8	13.0
≥college graduate	8.0	3.9	2.0	4.8
Religion				
Protestant	9.4	4.0	4.9	8.7
Catholic	4.5	4.6	0.9	7.8
Other	9.4	9.8	10.3	8.7
Region				
Northeast	6.2	3.6	4.0	3.6
South	6.6	3.4	3.1	8.1
Midwest	7.3	5.5	3.2	8.1
West	12.4	9.6	7.6	18.9
Parity‡				
0	7.2	4.5	1.8	6.1
1	7.2	4.5	8.1	12.6
≥2	8.8	6.4	4.4	7.9
Desire for more children‡				
Wants more	4.9	4.5	3.8	9.0
Wants no more	11.9	5.7	4.3	8.0
Current contraceptive method‡				
Medical	7.1	7.4	3.7	13.7
Barrier	9.4	6.8	8.8	6.8
Other	16.7	4.4	2.7	11.1
None	6.3	3.6	3.6	7.1

†Measured at baseline survey in 1991. ‡Measured at each follow-up survey (in 1993 and 1995). Note: Sample Ns may vary slightly for each variable due to missing data and nonresponse.

problems, and the ensuing litigation. Finally, the FDA approval of and the marketing of the injectable in 1992 might have taken away some of the implant’s potential market.

A multivariate analysis of intention to use the injectable (Table 6) demonstrates that the injectable appeals to a distinct group of women. Single women, women who have children, women with less than a college education and women who want to have a child (or another child) were at least twice as likely to express an intention to use the injectable in the next year as were married women, women who did not have a child, those with a college ed-

ucation and those who did not want a child. Because there were no age or race differences in intentions, these were excluded from the model, as retaining them had a suppressing effect on the other variables, thus reducing their predictive power.

Current contraceptive method had no bearing on whether women intended to use the injectable, although users of a barrier method were marginally more likely to do so than were women using a medical method. We also included in this analysis an attitude scale measuring women’s perceptions of what it would be like to use an injectable method. For the sake of simplicity, we categorized the attitude variable and split it at the 50th percentile. As a discrete (continuous) variable, the scale indicated that the likelihood of intending to use the injectable increased if women expressed more positive perceptions of what it would mean for them to use this method (Table 6): Women in the top 50% in their attitude toward the injectable were five times as likely to express an intention to use the injectable as were women in the bottom 50% of the attitude scale.

We also attempted to predict who would express an intention to use the implant in the year following the survey. However, we were not able to model the intention to use the implant, primarily because of the very small number of women who expressed an interest—and thus the highly skewed distribution of the sample. None of the characteristics that we used to predict implant use intention attained statistical significance. We also modeled use intention of the injectable or the implant jointly. However, such a model combining use intention of the two methods is heavily influenced by the pattern of injectable use intention, and as a result does not reveal any more information than is shown by the injectable model alone.

Stability and Reliability of Intentions

In accordance with our conceptual approach, we posit a high correlation between a woman’s intention to use a long-acting contraceptive method and her actual behavior. In fact, our data show that use intention is unstable and that there is only a weak relationship between intention and actual behavior. Just a fraction of the women who said they intended to use the implant in 1991 repeated that intention in 1993 (12%), and only 5% of women who in 1991 said they would use the implant were actually doing so in 1993 (not shown).

Table 6. Odds ratios from logistic regression model showing effect of selected variables on intention to use injectable contraceptive in the next 12 months (N=435)

Variable	Odds ratio	p
Marital status		
Single	2.17	<.04
Married	1.00	
Education		
<college	1.00	
College	0.33	<.02
Parity		
0	1.00	
≥1	2.33	<.05
Contraceptive use		
Medical method	1.00	
Barrier method	1.40	<.10
No method	0.91	ns
Desires a child		
Yes	2.34	<.03
No	1.00	
Attitudes toward injectable scale		
Top 50%	5.13	<.001
Bottom 50%	1.00	
-2 log likelihood	236.9	
Chi-square	33.5(8)***	

The lack of correspondence between intentions in 1991 and 1993 and the weak relationship between intention in 1991 and actual use in 1993 might be attributed to the ambiguity and lack of specificity in the intention question in 1991. However, correspondence between the 1993 and 1995 intentions and between 1993 intentions and 1995 behavior are not much different. Only about 20% of those who said in 1993 that it was likely that they would use the implant in the next 12 months reported a similar intention in 1995, and just 5% had actually used or were using the implant.

Data for the injectable also show a weak relationship between use intention and behavior. Eleven percent of women who in 1993 said it was likely that they would use the injectable in the next 12 months reported a similar intention in 1995. Moreover, by 1995, none of those who said in 1993 that they would use the injectable were using or had used this method.

Clearly, intentions are subject to change. It is reasonable to expect that a measure of intention collected at some time prior to a behavior may differ from the person’s intention at the time her behavior is observed. Further, the longer the interval between measurement of intention and observation of behavior, the greater the likelihood that the individual may have obtained new information or that intervening events may have changed her intention. We believe this was the case for the implant. Realization of intentions also

depends on the degree to which carrying out the intention is completely under the person's control. Among others, external factors such as accessibility, availability, cost, approval of the husband or partner, and influence of the provider or clinician can affect an individual's control over method choice.

Attitudes Toward Future Use

Low levels of use intentions for the two long-acting contraceptive methods were accompanied by rather strong negative attitudes toward the use of these methods (Table 7). More than one-half of the women surveyed in 1993 said using the implant would be bad for them, as did three in five about the injectable in 1995. Undoubtedly, such feelings are based on the perceptions of the putative side effects of these methods. In 1993, two-thirds of the women expected the implant to cause side effects, and three-fourths of the women in the 1995 sample were concerned about the side effects of the injectable.

Other negative attitudes toward these methods include inconvenience (for the injectable only), difficulty in obtaining them, discomfort in use (for the implant only) and health concerns. Also important is the element of cost: More than 60% expressed concern in 1993 that the implant was expensive to obtain, and in 1995 nearly one-half of the women reported cost as a negative factor for the injectable. Finally, 60% thought neither method would please their husband or partner (among those who had a husband or partner).

The degree to which any of these concerns or attitudes are based on accurate in-

formation is not clear. The limited knowledge scales used in these surveys indicate that most women were generally rather well-informed, but we do not know how such attitudes are influenced by the amount and accuracy of knowledge about these methods. What seems to be clear is that among a relatively representative national sample of women in their mid-20s to early 40s, neither of these methods is likely to attain the popularity of the pill or surgical sterilization. In addition, use of these methods may not even reach the levels seen for the diaphragm and the IUD in the late 1970s and early 1980s.

Conclusion

It is clear from our data and from work by others²⁴ that long-acting reversible contraception has not fulfilled its promise. The answer to the question that we pose in the title of this article is that American women are not using long-acting contraception because they continue to rely heavily on contraceptive sterilization and the pill, because by and large they profess to be satisfied with the method they are using, because a substantial proportion of women are not sufficiently informed about and may have misperceptions concerning these methods, because a large proportion of women are fearful of the side effects of these methods and are concerned about their health, and because a substantial proportion of the women find the two methods uncomfortable, inconvenient and expensive to use.

It should also be noted that neither of these methods prevents the transmission of STDs and HIV. Women who are likely to engage in high-risk sexual behavior that exposes them to these diseases may prefer to use condoms, rather than use dual methods to prevent both pregnancy and STD infections.

The low prevalence of use and the low level of use intention for the implant and the injectable do not hold much promise for the future of these methods. A somewhat more optimistic view that can be gleaned from our data is that both methods seem to appeal to certain subgroups of women. Through special interventions and social marketing, it might be possible to disabuse some of these of their misperceptions regarding the implant and injectable, and possibly increase their willingness to try them. Specifically, both methods seem to appeal to young single women who do not want children but are not ready for or do not want surgical sterilization. While current use levels among these groups are higher than they are among others, there

is still ample room for growth.

To date, most studies on implant and injectable use have been hampered by either their sampling design or their sample size (or both). Unfortunately, this article is no exception. We were equally hampered by sample attrition between surveys, and ultimately by the small sample sizes on which many analyses are based. Also, while injectable use is somewhat more popular among teenagers and very young adults, these women were not part of our sample. Moreover, highly skewed distributions of the outcome variables of interest, particularly those pertaining to the implant, also hindered our efforts to answer the research questions that we posed.

While some ambiguity remains in our findings, the results nonetheless may prove useful in understanding why American women have been reluctant to use these two methods, and they provide a direction for future research. The most recent cycle of the National Survey of Family Growth is based on a large nationally representative large sample of women in the reproductive ages. Careful analyses of these data might yield new and more reliable information on implant and injectable use. Such nationally representative surveys also need to be supplemented by quantitative and qualitative studies among clinic populations and local area samples to fully understand the decision-making mechanism surrounding the use of long-acting contraceptive methods. The scope and methods of large-scale national surveys preclude in-depth inquiries into many of the unanswered questions regarding implant and injectable use.

References

1. Mosher WD, Contraceptive practice in the United States, 1982-1988. *Family Planning Perspectives*, 1990, 22(5):198-205; and Mosher WD and Pratt WF, Contraceptive use in the United States, 1973-1988. *Advance Data from Vital and Health Statistics*, 1990, No. 182.
2. Forrest JD, The end of IUD marketing in the United States: what does it mean for American women? *Family Planning Perspectives*, 1986, 18(2):52-55 & 57.
3. Mauldin WP and Ross JA, Historical perspectives on the introduction of contraceptive technology, in Segal SJ, Tsui AO and Rogers SM, eds., *Demographic and Programmatic Consequences of Contraceptive Innovations*, New York: Plenum Press, 1989.
4. Mosher WD, 1990, op. cit. (see reference 1).
5. Affandi B et al., Insertion and removal of NORPLANT contraceptive implants by physicians and nonphysicians in an Indonesian clinic. *Studies in Family Planning*, 1987, 18(5):302-306; Basnayake S, Thapa S and Balogh SA, Evaluation of safety, efficacy, and acceptability of NORPLANT implants in Sri Lanka. *Studies in Family Planning*, 1988, 19(1):39-47; Lubis F et al., One-year experience with NORPLANT implants in Indonesia. *Studies in Family Planning* (continued on page 191)

Table 7. Percentage of women at risk of pregnancy expressing specific attitudes toward use of the hormonal implant and the hormonal injectable

Attitude	Implant (N=493)	Injectable (N=475)
Use of the method will be:		
Bad	55.7	61.1
Difficult to obtain	38.0	37.4
Unhealthy	38.2	50.8
Uncomfortable	40.5	na
Inconvenient	na	33.5
Expensive	60.7	47.5
Unnecessary	77.9	na
The method will:		
Be painful to use	44.7	44.6
Cause side effects	66.6	75.4
Not make partner happy†	61.5	61.1

†Among those with a partner. Notes: na=not applicable, because question was not asked. The question concerning the implant was asked in 1993; the question concerning injectables was asked in 1995.

Why Are U.S. Women...?

(continued from page 183)

Planning, 1983, 14(6-7):181-184; Marangoni P et al., NORPLANT implants and the TCu 200 IUD: a comparative study in Ecuador, *Studies in Family Planning*, 1983, 14(6-7):177-180; Salah M et al., Five-year experience with NORPLANT implants in Assiut, Egypt, *Contraception*, 1987, 35(6):543-550; Satayapan SK, Kanchanasinith K and Varakamin S, Perceptions and acceptability of NORPLANT implants in Thailand, *Studies in Family Planning*, 1983, 14(6-7):170-176; and Sivin I et al., A four-year clinical study of NORPLANT implants, *Studies in Family Planning*, 1983, 14(6-7):184-191.

6. Liskin L and Blackburn R, Hormonal contraception: new long-acting methods, *Population Reports*, Series K, No. 3, 1987; Phillips JF et al., A case study of contraceptive introduction: domiciliary depot-medroxyprogesterone acetate services in rural Bangladesh, in Segal SJ, Tsui AO and Rogers SM, 1989, op. cit. (see reference 3); Segal SJ, Contraceptive innovations: needs and opportunities, in *ibid.*; Singh K, Viegas OAC and Ratnam SS, Attitudes towards contraceptive implants and injectables among present and former users in Singapore, *Journal of Biosocial Science*, 1990, 22(1):1-11; and World Health Organization Expanded Programme on Research Development and Research Training in Human Reproduction, Task Force on Long-Acting Systemic Agents for the Regulation of Fertility, A multicentered Phase III comparative trial of two hormonal contraceptive preparations given once a month by intramuscular injection, *Con-*

traception, 1988, 37(1):1-20.

7. Abma J et al., Fertility, family planning, and women's health: new data from the 1995 National Survey of Family Growth, *Vital and Health Statistics*, Series 23, No. 19, 1997.

8. Westoff CF, Moreno L and Goldman N, The demographic impact of changes in contraceptive practice in third world populations, in Segal SJ, Tsui AO and Rogers SM, 1989, op. cit. (see reference 3).

9. Brown SS and Eisenberg L, eds., *The Best Intentions: Unintended Pregnancy and the Well-Being of Children and Families*, Washington, DC: National Academy Press, 1995; and Henshaw SK, Unintended pregnancy in the United States, *Family Planning Perspectives*, 1998, 30(1):24-29 & 46.

10. Hatcher RA et al., *Contraceptive Technology*, 16th revised edition, New York: Irvington Publishers, 1994.

11. Sivin I, International experience with NORPLANT and NORPLANT-2 contraceptives, *Studies in Family Planning*, 1988, 19(2):81-94; Satayapan SK, Kanchanasinith K and Varakamin S, 1983, op. cit. (see reference 5); and Liskin L and Blackburn R, 1987, op. cit. (see reference 6).

12. Sivin I, Norplant clinical trials, in Samuels SE and Smith MD, eds., *Norplant and Poor Women*, Menlo Park, CA: The Henry J. Kaiser Family Foundation, 1992, pp. 1-19.

13. Hatcher RA et al., 1994, op. cit. (see reference 10).

14. *Ibid.*

15. Cushman LF et al., Beliefs about Depo-Provera among three groups of contraceptors, *Advances in Contraception*, 1996, 12(1):43-52.

16. Cushman LF et al., Beliefs about Norplant implants among low income urban women, *Contraception*, 1996, 53(5):285-291.

17. Kalmuss D et al., Determinants of early implant discontinuation among low-income women, *Family Planning Perspectives*, 1996, 28(6):256-260.

18. Abma J et al., 1997, op. cit. (see reference 7).

19. Fishbein M and Ajzen I, *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Reading, MA: Addison-Wesley, 1975.

20. Tanfer K, Knowledge, attitudes and intentions of American women regarding the hormonal implant, *Family Planning Perspectives*, 1994, 26(2):60-65.

21. Tanfer K, Wierzbicki S and Payn B, Why aren't U.S. women using long-acting contraception? paper presented at the annual meeting of the Population Association of America, Chicago, April 2-4, 1998.

22. *Ibid.*

23. Tanfer K, 1994, op. cit. (see reference 20).

24. Abma J et al., 1997, op. cit. (see reference 7); Sivin I, 1992, op. cit. (see reference 12); Cushman LF et al., 1996, op. cit. (see reference 15); Cushman LF et al., 1996, op. cit. (see reference 16); Kalmuss D et al., 1996, op. cit. (see reference 17).