International Journal of Technology Assessment in Health Care, **18:3** (2002), 625–634.

THE IMPACT OF ENDOMETRIAL ABLATION ON HYSTERECTOMY RATES IN WOMEN WITH BENIGN UTERINE CONDITIONS IN THE UNITED STATES

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Abstract

Objective: To assess the impact of endometrial ablation on the utilization of hysterectomy in U.S. women with benign uterine conditions.
Methods: Data are from the State Inpatient and Ambulatory Surgery Databases of the Healthcare Cost and Utilization Project for six states, 1990–97. Women who underwent hysterectomy (ICD-9-CM codes 68.3, 68.4, 68.5, 68.51, 68.59, 68.9) and endometrial ablation (68.23, 69.29) and had benign uterine conditions (ICD-9-CM code 218.0 and CCS groupings 47, 171, 173, 175, 176, 215) were extracted. Comparative rates, length of stay, total charges, age, payer, hospital, and teaching status of the hospital are reported.
Results: The rates of hysterectomy decreased in three states: Colorado (37% decrease; 33 per 10,000 women in 1990 to 21 per 10,000 in 1997), Maryland (18% decrease; 17/10,000 in 1990 to 14/10,000 in 1997), and New Jersey (11% decrease; 9/10,000 to 8/10,000); were static in two states (Connecticut and New York) and increased in one state, Wisconsin (11% increase; 19/10,000 in 1994 to 21/10,000 in 1997). The rates for endometrial ablation increased in all states. The ratio of hysterectomy rates to endometrial ablation rates fell in each state across the 7 years. In two states (New York and New Jersey) the rate of endometrial ablation was equivalent to the rate of hysterectomies by 1997. The total combined rate for hysterectomy and endometrial ablation for women with benign uterine conditions for each state increased by more than 10%, with the exception of Maryland, which had an increase of only 5%, and Colorado, which had a decline of 23%.
Conclusions: In the six states studied, the diffusion of endometrial ablation has had a varying impact on hysterectomy rates among women with benign uterine conditions. However, endometrial ablation is used as an additive medical technology rather than a substitute.

Keywords: Endometrial ablation, Hysterectomy, Menorrhagia

Hysterectomy is the most common non–pregnancy-related surgery for women in the United States (10;19;21;26;28). Over 600,000 hysterectomies are performed each year in the United

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States, such that one in three women will have a hysterectomy before the age of 60 (11). Hysterectomy rates continue to vary both internationally and nationally, with the highest rates in the United States and the lowest rates in Norway and Sweden (25). Within the United States, hysterectomy rates are highest in the southern and western regions, and lowest in the northeastern regions (10). Concern has been expressed for some time about the inappropriate use of hysterectomy (4;9). Furthermore, approximately 40,000 women who have a hysterectomy will have new symptoms after the hysterectomy such as pelvic pain and depression (6;18).

In 1980 endometrial ablation was introduced as an alternative to hysterectomy for abnormal uterine bleeding (16). The U.S. Food and Drug Administration approved the use of laser endometrial ablation for the treatment of chronic menorrhagia in 1986, and since that time use of the procedure has steadily increased. It is performed primarily for abnormal uterine bleeding in women without large leiomyoma. The aim of endometrial ablation is to alleviate excessive menstrual bleeding by destroying or removing the endometrial lining while conserving the uterus, thereby producing amenorrhea or hypomenorrhea. A systematic review of the randomized controlled trials of hysterectomy with endometrial ablation has shown short-term benefits of less operative morbidity, more rapid recovery, and lower costs (22). However, after four years, 24% of women who have endometrial ablation will undergo a hysterectomy (1).

While endometrial ablation will never replace hysterectomy completely, there is a group of women who will benefit from the procedure and avoid hysterectomy. As a result, researchers predicted that endometrial ablation procedures would reduce hysterectomy rates in premenopausal women with abnormal uterine bleeding (14;23). In the United States, women aged 25–55 years make 2.9 million annual office visits for disorders of menstruation, of which 1.9 million are for heavy bleeding, metrorrhagia, and dysfunctional uterine bleeding (15). This suggests that the majority of women with menstrual disorders have uterine bleeding disorders and therefore are potentially amenable to endometrial ablation rather than hysterectomy.

The aim of this study was to evaluate the impact of endometrial ablation on hysterectomy rates in the United States in women who had benign uterine conditions that would be suitable for endometrial ablation.

METHODS

We obtained data from the Healthcare Cost and Utilization Project (HCUP), which is built and disseminated through a federal-state-industry partnership sponsored by the Agency for Healthcare Research and Quality (AHRQ) (28). The State Inpatient Databases (SID) include all discharges from acute care community hospitals, and the ambulatory surgery databases include all discharges from hospital-based facilities. Data were available from Colorado, Maryland, New Jersey, and New York from 1990–97, from Connecticut from 1993–97, and from Wisconsin from 1994–97. These are the only states and years for which complete data were available for analyses at the time of this study. All discharges with an International Classification of Diseases (ICD-9-CM) code corresponding to endometrial ablation and hysterectomy for women 20–49 years of age were extracted from these data sets. Endometrial ablation was defined as the presence of ICD-9-CM procedure code 68.23 for endometrial ablation for the years 1996 and 1997. For the years prior to 1996, endometrial ablation was coded as 68.29, other excision or destruction of the uterus. Hysterectomy was defined as the presence of ICD-9-CM procedure code 68.4 for abdominal hysterectomy; 68.5, 69.51, or 68.59 for vaginal hysterectomy; 68.3 for subtotal or supracervical hysterectomy; and 68.9 for other and unspecified hysterectomy in the discharge record.

In order to compare the rates of utilization of the procedures in similar patient populations, the ablation and hysterectomy procedures were further limited to diagnostic codes consistent with benign uterine conditions. The Clinical Classification Software (CCS) was used to define the diagnostic categories (7). The CCS is a tool for clustering patient diagnoses into a manageable number of clinically meaningful categories, developed at the AHRQ. The following CCS groupings were used to identify benign uterine disorders amenable to endometrial ablation: menstrual disorders (171), menopausal disorders (173), other female genital disorders (175), other and unspecified benign neoplasm (47), contraceptive and procreative management (176), and genitourinary congenital anomalies (215), as well as the ICD-9 code for benign neoplasm of the uterus (submucous leiomyomas 2180). The objective was to capture the majority of ablations and to have comparable indications for hysterectomy. Although the inclusion of CCS 176 and 215 are more appropriate for ablation than hysterectomy, the total numbers in this category were in fact small and made little difference to the overall statistics.

Variables that were extracted included length of stay, total facility charges (charges do not include physician charges), age, primary payer, location and teaching status of the hospital, and the diagnoses vector. Data on total charges for ambulatory surgery were missing from New York, and therefore neither inpatient nor ambulatory surgery data from New York were included in the analysis of the total charge data.

Statistical Analysis

Age-adjusted rates of hysterectomy and endometrial ablation for each state and year were calculated using direct standardization methods. The denominators for the procedure rates are all women age 20–49 years in each state for each year and were derived from the U.S. census figures for that state and year. The Colorado 1990 census was used to represent the standard population. For each procedure (hysterectomy or ablation), the median length of stay was calculated to avoid skewing of the data. Mean total charges and distribution of primary payer were calculated. The frequency distribution of each procedure was calculated for 10-year age intervals and for CCS-defined diagnostic groupings. The unadjusted association of age, primary payer, location, and teaching status of hospital was calculated across hysterectomy and endometrial ablation using chi-square analysis. SAS software was used to conduct the analyses.

RESULTS

Rates for endometrial ablation for benign uterine conditions increased from 1990 to 1997 in each state (Figure 1). The rates of hysterectomy declined from 1990 to 1997 in three states: Colorado (37% decrease; 33 per 10,000 women in 1990 to 21 per 10,000 in 1997), Maryland (18% decrease; 17 per 10,000 in 1990 to 14 per 10,000 in 1997), and New Jersey (11% decrease; 9 per 10,000 in 1990 to 8 per 10,000 in 1997) (Figure 2). The rates of hysterectomy in New York and Connecticut were static, and in Wisconsin rates of hysterectomy increased by 11% (19 per 10,000 in 1990 to 21 per 10,000 in 1997). The ratio of hysterectomy rates to endometrial ablation decreased in each state (Table 1). The total combined rate for hysterectomy and endometrial ablation for women with benign uterine conditions for each state increased by more than 10% with the exception of Colorado, which had a decline of 23%, and Maryland, which had an increase of only 5% (Figure 3).

There was considerable variation between individual states for both procedures. For hysterectomy in 1990, there was nearly a four-fold variation in rates, with New Jersey demonstrating the lowest rate at 9 per 10,000 women and Colorado demonstrating the highest rate at 33 per 10,000 women (Figure 2). The difference in rates for endometrial ablation between the states was not as great. In 1990 there was only a two-fold difference

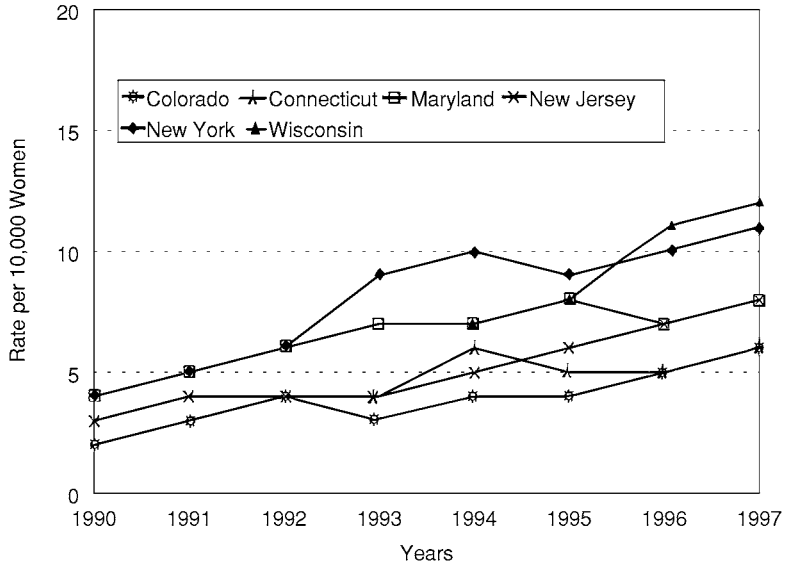

Figure 1. Rate of endometrial ablation for benign uterine conditions across six states, 1990–97. Rates were calculated for each state and year. The denominators for the procedure rates are all women age 20–49 years in each state for each year and were derived from the U.S. census figures for that state and year. Rates were age-adjusted using direct standardization. The Colorado 1990 census was used to represent the standard population. Data were not available in Connecticut until 1993, nor in Wisconsin until 1994.

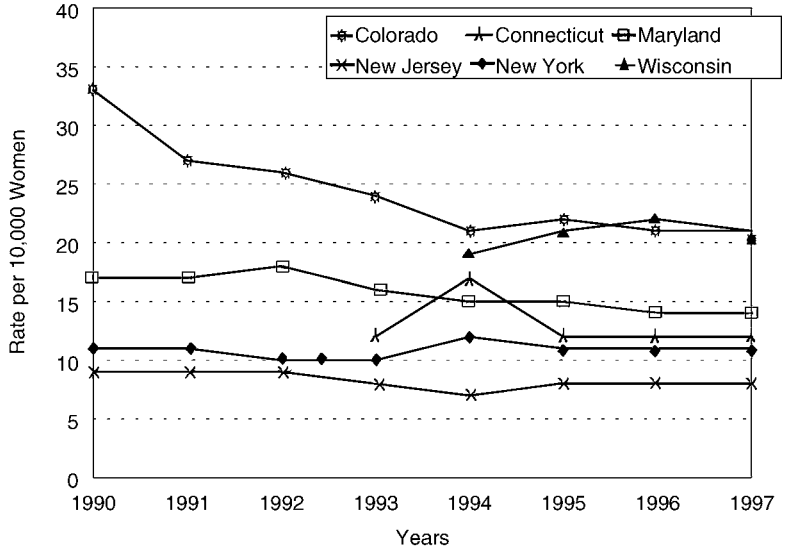

Figure 2. Rate of hysterectomy for benign uterine conditions across six states, 1990–97. Rates were calculated for each state and year. The denominators for the procedure rates are all women age 20–49 years in each state for each year and were derived from the U.S. census figures for that state and year. Rates were age-adjusted using direct standardization. The Colorado 1990 census was used to represent the standard population. Data were not available in Connecticut until 1993, nor in Wisconsin until 1994.

https://doi.org/10.1017/S0266462302000466 Published online by Cambridge University Press

Table 1. Rate Ratios (Hysterectomy Rate: Endometrial Ablation Rate) for each State[a]

	1990	1994	1997
Colorado	16.5	5.3	3.5
Connecticut		3.0	2.0
Maryland	4.3	2.3	1.8
New Jersey	3.0	2.0	1.0
New York	2.8	1.1	1.0
Wisconsin		2.7	1.8

[a]Calculated by dividing the hysterectomy rate by the endometrial ablation rate for each state and year. See Figures 1 and 2 for actual rates.

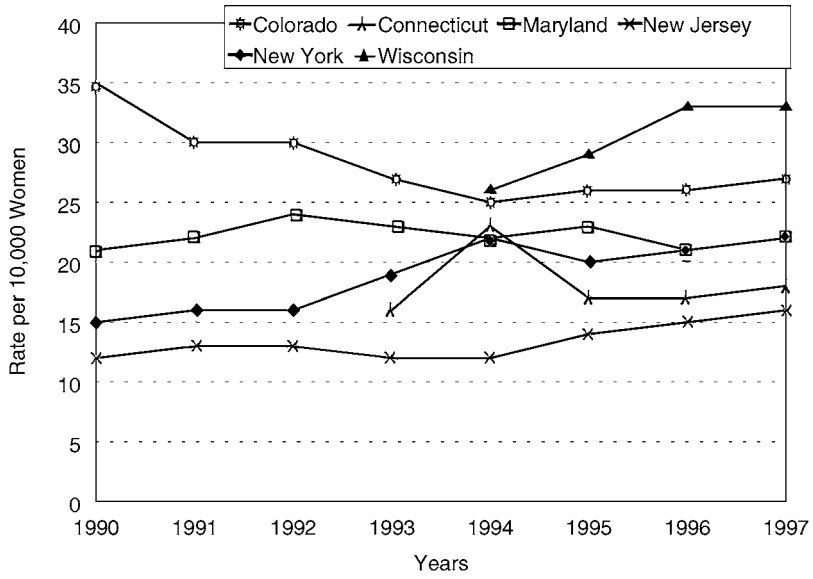

Figure 3. Combined rate of hysterectomy and ablation for benign uterine conditions across six states, 1990–97.

in rate from lowest in Colorado at 2 per 10,000 women to highest in New York at 4 per 10,000 women (Figure 1).

Endometrial ablation is primarily an ambulatory surgery procedure with a length of stay less than 1 day both in 1990 and 1997. The median length of stay for hysterectomy was 4 days in 1990 and 3 days in 1997. The mean total charges for endometrial ablation were $2,367 in 1990 and $3,369 in 1997. The mean total charges for hysterectomy were $4,138 in 1990 and $7,032 in 1997. Data on demographics, payer, and hospital characteristics for women receiving the two procedures are presented in Table 2. Over the time period studied the proportion of women with benign uterine conditions who underwent ablation increased from 19.9% to 41.1%. Endometrial ablation was more frequently performed than hysterectomy for women aged between 20 and 29 years by 1997 (55.8%).

The most common diagnostic codes in 1990 for hysterectomy were menstrual disorders and submucous fibroids (Table 3). In contrast, for endometrial ablation, submucous fibroids alone were coded most often in 1990, and by 1997 other female genital disorders was the most frequent coding. Overall, in 1997 submucous fibroids and menstrual disorders accounted for 71% of all hysterectomies and for 58% of endometrial ablations.

https://doi.org/10.1017/S0266462302000466 Published online by Cambridge University Press

Table 2. Comparison of Patient and Hospital Characteristics of Hysterectomy and Endometrial Ablation for Six States, 1990 and 1997[a]

	1990			1997		
	No. of patients	% Hysterectomy	% Ablation	No. of patients	% Hysterectomy	% Ablation
Total patients	13,728	81.1	19.9	23,704	58.9	41.1
Age						
20–29	956	62.1	37.9	1,343	44.2	55.8
30–39	5,184	73.1	26.9	8,635	52.1	47.9
40–49	7,588	87.0	13.0	13,726	64.6	35.4
Payer						
Medicare	107	79.5	20.5	353	66.3	33.7
Medicaid	932	87.9	12.1	1,522	71.2	28.8
PPO/BCBS	10,059	79.0	21.0	10,402	54.4	45.6
HMO	1,774	84.2	15.8	9,133	57.5	42.5
Other	853	75.3	24.7	1,398	65.9	34.1
Teaching hospital	6,845	76.1	23.9	11,627	53.8	46.2
Urban hospital	12,680	79.3	20.7	21,169	57.4	42.6

[a]All comparisons are statistically significant at $p = .001$ by chi-square analysis.

Table 3. Frequencies of Diagnostic Groupings for Endometrial Ablation and Hysterectomy for Six States, 1990 and 1997[a]

Diagnostic group	Procedure	1990[b] (%)	1997 (%)
Submucous fibroid	Endometrial ablation	39.8	30.1
	Hysterectomy	35.5	34.4
Other/unspecified benign neoplasm	Endometrial ablation	5.8	1.9
	Hysterectomy	5.8	5.5
Menstrual disorders	Endometrial ablation	18.5	28.3
	Hysterectomy	35.8	39.9
Other female genital disorders[c]	Endometrial ablation	29.3	35.6
	Hysterectomy	21.9	18.5
Other[d]	Endometrial ablation	6.6	4.2
	Hysterectomy	6.8	1.5

[a]Diagnostic groupings use CCS (18).
[b]Data not available for Connecticut and Wisconsin in 1990.
[c]Includes more than 50 ICD-9 codes, including codes for noninflammatory conditions of the genital organs, pelvic congestion syndrome, and metrorrhagia.
[d]Includes genitourinary symptoms and ill-defined conditions, contraceptives, genitourinary anomalies, and management of menopause.

DISCUSSION

Diffusion of endometrial ablation has had a varying impact on hysterectomy rates in the six states studied among women with benign uterine conditions. The combined rate of hysterectomy and endometrial ablation for women with benign uterine conditions increased in four states, was static in one, and decreased in one. Those states with the largest increases in endometrial ablation do not consistently have the largest decrease in hysterectomy rates. For example, New York demonstrated a nearly two-fold increase in ablation rates, yet its hysterectomy rate remained unchanged. Wisconsin also had a large increase in ablation rates over the 4 years studied, but the hysterectomy rate also increased. The only state that has both a large increase in endometrial ablation and a meaningful decrease in hysterectomy is Colorado. However, as Colorado had a hysterectomy rate in 1990 two to three times higher than the other states, there may be other explanations for the decline. In addition,

the proportionate increases in endometrial ablation do not mirror proportionate decreases in hysterectomy in any of the six states studied. The increases in ablation rates were between 33% and 200%, while any measurable decrease in hysterectomy rates was between 11% and 37%. Overall, these results suggest that substitution of hysterectomy with the newer and less invasive procedure of endometrial ablation has not occurred in five of the six states studied. There are several possible explanations for this finding.

First, there are other examples in the literature where newer medical technologies do not simply replace existing procedures. For example, after laparoscopic cholecystectomy was introduced at the beginning of the 1990s, rates of cholecystectomy rose by 28%, which was thought to result from a lowering of the threshold for surgery for patients of similar clinical risk (13;27). The shorter recovery time with less postoperative morbidity may have been a factor in encouraging patients with less severe symptoms to undergo laparoscopic cholecystectomy. It is possible that women and physicians viewed ablation as a less invasive technique, and therefore an additional group of women who may not have been willing to undergo a major surgery for abnormal uterine bleeding are willing to undergo an ambulatory surgery procedure.

Second, it is also probable that our analysis includes women who have had more than one procedure. Data from these 6 states represent individual observations and do not include data elements to account for recurrent treatments or episodes of care. Additional uterine procedures following endometrial ablation are reported at 38% over 4 years, and hysterectomy represents 24% of the repeat procedures (1). Therefore, some of the measured increased in ablation may be due to repeat ablations. In addition, the minimal change in hysterectomy may be partly explained as well, if hysterectomy follows failed ablations.

Finally, two of the most effective treatments for the management of heavy menstrual bleeding in the nonfibroid uterus were not available in the United States during the 1990s. One is the levonorgestrel intrauterine system (LNG-IUS) (24). In a randomized controlled trial of the LNG-IUS offered to women with dysfunctional uterine bleeding who were on a waiting list for hysterectomy, 64% of the women using the LNG-IUS canceled their hysterectomies compared with 14% in the control group. At 23 months of follow-up, nearly 50% continued with their choice (20). The LNG-IUS was only recently approved for use in the United States. Another effective treatment is an antifibrinolytic agent, tranexamic acid (8). This medication is widely available in Europe, the United Kingdom, Australia, and New Zealand but not licensed for use in the United States. It is possible that in the future, combined use of effective nonsurgical treatments and endometrial ablation will lead to a reduction in hysterectomy rates in the United States.

The results from this study cannot be extrapolated to predict changes in the total annual national rates for hysterectomy in the United States. However, an examination of the Nationwide Inpatient Sample database of HCUP from 1993 to 1997 demonstrates an increase in total numbers of hysterectomy. There were an estimated 521,854 hysterectomies in 1993 (rate of 50 per 10,000 women), which increased to 577,217 in 1997 (rate of 56 per 10,000 women) (17). Therefore, it seems unlikely that endometrial ablation has had any impact on national hysterectomy rates in the United States.

The United States data for the six states presented here are similar to the experience in both the United Kingdom and Australia. Increases in the combined number of procedures for abnormal uterine bleeding have been reported in the United Kingdom (2;3). Hysterectomy had remained stable while the rate of endometrial ablation rose fourfold. The combined rates of procedures for abnormal uterine bleeding in the United Kingdom initially increased until 1993–94, then declined again to rates similar to 1989–90. The U.K. figures were interpreted as an initial enthusiasm for the ablation procedure, followed by the realization that ablation was not as effective as initially thought. The introduction of the LNG-IUS into the United Kingdom in May 1995 and the dissemination of an Effective Health Care

Bulletin in 1995 advocating the greater use of an antifibrinolytic agent, tranexamic acid, were other possible reasons for the subsequent decline in hysterectomy rates after 1994 (12). In Australia hysterectomy rates also declined after ablation was first introduced and then started to rise again (30).

The strength of HCUP data is the longitudinal nature of the data and that multiple states are represented (28). However, ambulatory data were only available from six states, and for this reason we are not able to calculate national rates for ablation or make an assessment of regional variation of rates beyond the six states where data were available. We will not account for women who had either hysterectomies or ablations in a few military facilities, but we do not feel this will significantly affect our results. We do not believe that ablations are being performed in physicians offices, which also are not captured in our data, since ablations require a surgical setting. Finally, we may be missing some women who may have had ablations in free-standing ambulatory surgery facilities. It is difficult to assess how many procedures this may represent, and we may be underestimating both the rate of ablation and combined procedure rates. However, this will not change our finding that rates of hysterectomy remained largely unchanged, since hysterectomy remains inpatient.

The charges and length of stay data may appear contradictory. The median length of stay declined by 1 day over the 8 years studied, yet the total charges for ablation increased by 42% and for hysterectomy increased by 70%. This finding was confirmed using the HCUP NIS data. The average total charges for hysterectomies have increased from $8,647 in 1993 to $9,690 in 1997, while the average length of stay declined from 3.9 to 3.1 days over the same time period (17). The explanation for the rise in mean total charges is likely due to greater intensity of services offered as well as continuing increases in the cost of health care, which is frequently in double digits each year. In addition, endometrial ablation has a recognized reoperation rate. One randomized controlled study of endometrial ablation and hysterectomy in Scotland reported that immediately after surgery, endometrial ablation costs were 32% of hysterectomy (5). However, due to the reoperation rate, by 4 months the cost of endometrial ablation was 53% of hysterectomy, by 2 years it was 71%, and by 4 years it varied from 89% to 95%. In this study we are only reporting on the differences in charges at the time of surgery. In 1990 endometrial ablation was 57% of hysterectomy charges and by 1997 had declined to 48%.

POLICY IMPLICATIONS

The objective of introducing this new technology, endometrial ablation, was to provide a less invasive, effective alternative to the current treatment of hysterectomy for benign uterine conditions. Researchers predicted that endometrial ablation procedures would reduce hysterectomy rates in premenopausal women with abnormal uterine bleeding, especially given the ongoing controversy about overuse of hysterectomy in the United States. Our study has demonstrated that endometrial ablation is more often an additive technology rather than a substitutive. Hysterectomy rates remain largely unchanged, and combined procedure rates are increasing. As a result, costs are likely to increase, while quality of care for a very common condition remains unchanged.

The continuing challenge for policy makers and those who fund health care is to allow the introduction of useful technologies without impeding progress. Although there is good evidence for use of endometrial ablation as an alternative to hysterectomy, its lack of impact on hysterectomy rates suggests that the threshold for treatment of benign uterine conditions may have lowered. Strategies to reduce hysterectomy rates in favor of endometrial ablation and other nonsurgical interventions should be implemented at the introduction of these new techniques and alternatives.

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