
Influence of Demographics and Profitability on Physician Selection of Family Practice Procedures

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Background. Family physicians must make complex decisions regarding which procedures to learn in training and which to perform in practice. Factors that influence these decisions include community needs, the potential profitability of a procedure, and the desires and skills of the individual physician.

Methods. To further clarify some of these influences, we surveyed members of the Wisconsin Academy of Family Physicians. The survey instrument included questions about 27 different procedures, including the perceived profitability of the procedure, which procedures they had discontinued, and which they planned to learn.

Results. More than 40% of family physicians reported doing skin surgery, flexible sigmoidoscopy, nonstress obstetrical testing, breast-cyst aspiration, multiple joint arthrocentesis, and Norplant insertion, whereas fewer than 6% perform colonoscopy, esophagogastroduodenoscopy, and nasolaryngoscopy. Fifty-seven percent of physicians had discontinued at least one procedure, and 34% planned to learn one or more procedures. Being

younger, male, and practicing in smaller communities correlated with performing a greater number of procedures ($P<.001$), but female physicians performed more gynecologic procedures ($P<.05$). There was a statistically significant correlation ($r=-.478$, $P<.05$) between perceived low profitability of a procedure and family physicians discontinuing a learned procedure, and a marginal correlation between perceived profitability and planning to learn a procedure ($r=.338$, $P<.1$).

Conclusions. Family physicians in Wisconsin vary greatly in the number and types of procedures performed. Community size, sex, and age are important variables associated with the number and type of procedures performed. The performance of procedures is dynamic: physicians both discontinue learned procedures and learn new procedures. The profitability of the procedure influences the learning and discontinuation of procedures.

Key words. Procedures; family practice; medical residency; income. (*J Fam Pract* 1994; 39:341-347)

Family medicine leaders have agreed that managing patient medical care is the keystone competency area for family physicians.¹ However, procedures that were previously performed only by specialists have become viable for practicing physicians because of improved technology. Furthermore, increased emphasis on procedural skills and disease prevention have greatly influenced physician per-

ceptions of the need for, and potential profitability of, learning new procedures.

Residency training offers the opportunity to learn many procedures. Often, however, there is insufficient information to guide faculty and resident decisions about which procedures merit training emphasis. A study in general internal medicine has shown that the procedures taught in residency are not necessarily those most needed in practice.² Procedure skills obtained in the intensive care unit or the intensive care nursery during residency, for example, may or may not be useful in practice. At this time, the Residency Review Committee, the American Board of Family Practice, and the American Academy of Family Physicians have not recommended a core group of

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procedures that should be learned by family practice residents.

The current pattern of remuneration in medicine favors the performance of procedures and may place economic pressure on physicians to offer certain procedures. The question of which procedures to perform is particularly problematic for family physicians, who have a relatively lower income and a variety of procedures from which to choose. Some procedures, such as excision of benign skin lesions and Papanicolaou (Pap) smears, are commonly thought to be essential core procedural skills in family medicine.^{3,4} Other skills, such as colposcopy, are optional. Although they are not currently considered essential to the discipline, they represent a potential source of additional income for the physician and a service to the patient. The physician's decision whether to perform a given procedure should be based on adequate training, community need, physician interest, perceived quality of patient care resulting from availability of the procedure, and potential for additional revenue. Given the current economic climate, it is likely that cost concerns will assume an even larger role in decision-making than they have in the past.

We undertook this study as a step toward understanding the factors influencing choice of procedures in family medicine by attempting to identify and examine correlations between procedures performed by family physicians and community size, physician age, and physician sex. We also attempted to ascertain which procedures family physicians have discontinued, which they plan to learn, and the effect of perceived profitability on discontinuing a procedure and planning to learn a procedure.

Methods

Mailing labels for 1000 Wisconsin family physicians belonging to the Wisconsin Academy of Family Practice were randomized by computer to generate a list of 500 physicians who received questionnaires by mail in March 1993. One month later, a second mailing was sent to nonrespondents. The following month, a final third mailing was sent to the remaining nonrespondents.

The survey listed 27 procedures, including some considered new or controversial. We excluded most universally performed procedures. For each procedure included on the survey, respondents were asked (1) if they performed the procedure; (2) how many times they had performed it in the past year; (3) where they had learned the procedure; (4) where they perform the procedure; and (5) if the procedure is profitable. Physicians not performing a specific procedure were asked if they had done so previously; if the answer to this question was no, they

Table 1. Descriptive Characteristics of Wisconsin Family Physicians Responding to a Survey about Procedures Performed in Family Practice (n = 297)

Characteristic	Percentage
Sex	
Male	76
Female	24
Age distribution (y)	
< age 40	59
40-50	31
>50	10
Board-certified	95
Size of practice community	
<5000	20
5000-25,000	29
25,000-100,000	24
>100,000	27
Type of practice	
Solo	8
Staff model HMO	10
Family practice group	43
Multispecialty group	39

NOTE: Only 297 of the 325 respondents supplied all the demographic information requested.

were asked if they intended to learn the procedure in the future. Demographic data obtained from each respondent included age, sex, board-certification status, size of community of practice, type of practice (group, HMO, or solo), and whether the primary hospital had a family practice department.

Results

Sixty-five percent of the family physicians responded to the survey, for a total of 325 respondents (only 297 supplied all the demographic information requested). Table 1 displays the demographic characteristics of the respondents. They were predominantly male, board certified in family practice, and younger than age 40. They were evenly distributed among different community sizes. Family practice groups were the most common mode of practice.

Table 2 shows the proportion of respondents who performed the procedures in the past year. The mean number of different procedures performed was 6.9, with a range of 0 to 18. Univariate analysis showed that being male, younger, and practicing in a smaller community were all associated with the performance of a greater number of different procedures. In a multiple regression analysis using all three characteristics as independent variables, the three variables remained significantly associated

Table 2. Family Physicians' Responses to Survey Questions about 27 Procedures Performed in Family Practice (N=325)

Procedure	% Performing	% Indicating Greater Profit*	% Planning to Learn	Quit Ratio†
Skin and breast				
Excision of benign lesions	95	79	0.0	0.019
Excision of malignant skin lesions <2 cm	58.2	85	0.0	0.063
Excision of malignant skin lesions >2 cm	12.6	84	0.0	0.240
Breast cyst aspiration	53.8	57	2.5	0.137
Breast biopsy	9.2	75	0.70	0.967
Obstetrics and gynecology				
Nonstress obstetric testing	52.6	29	0.0	0.22
Norplant insertion	41.5	86	14.7	0.044
Cervical cryotherapy	27.4	77	9.0	0.20
Colposcopy	21.2	80	17.6	0.072
Obstetric ultrasound	4.3	78	2.60	1.64
Loop electrical excision procedure	3.4	100	12.7	0.27
Cardiopulmonary				
Spirometry	46.2	58	2.30	0.067
Holter monitor	25.5	69	2.10	0.048
Treadmill or exercise electrocardiogram	23.7	61	6.0	0.35
Vascular ultrasound	0.9	50	1.90	1.0
Gastroenterology				
Sigmoidoscopy	68.3	71	11.6	0.198
Hemorrhoid banding	5.2	53	4.9	1.47
Esophagoduodenoscopy	2.2	85	2.8	0.57
Colonoscopy	1.2	67	1.9	1.25
Eye, ear, nose, throat				
Nasalaryngoscopy: indirect	29.2	14	1.3	0.43
Tonometry	20.3	31	1.5	0.91
Nasalaryngoscopy: direct	5.8	43	9.0	1.30
Pediatric				
Neonatal umbilical artery catheterization	8.6	26	0.60	3.36
Neonatal bladder aspiration	7.4	33	1.7	3.42
Other				
Vasectomy: traditional	25.5	82	2.5	0.72
Vasectomy: no-scalpel	4.0	83	7.7	0.0
Arthrocentesis of joints other than knee	42.5	74	5.3	0.145

*Percentage of physicians indicating a procedure is more profitable than usual clinic time billed.

†Quit ratio = $\frac{\text{number who have quit the procedure}}{\text{number still performing the procedure}}$

with the number of different procedures performed ($P < .001$).

In Table 2, the 27 procedures are grouped by organ system. The proportion of respondents reporting that the procedure is more profitable than the income for usual clinic time billed, the procedures respondents reported planning to learn in the future, and those they had formerly performed but had now discontinued are listed.

Table 3, which lists the procedures performed most commonly according to community size, shows that an increased number of procedures are performed in smaller communities.

Although male physicians performed a greater num-

ber of different procedures than did female physicians, women performed some procedures more frequently than did their male counterparts. More female physicians performed colposcopy, loop electrical excision procedure (LEEP), and cryotherapy of the cervix. For the rest of the procedures, either more male physicians performed the procedure or there was no significant difference (Table 4). Type of practice was not associated with number of different procedures performed.

We used Spearman correlation coefficients between percent of respondents reporting profit for each procedure and several other aggregate variables for each procedure. Profit was negatively correlated with the quit ratio

Table 3. Relationship Between Family Physician Performance of 18 Procedures and Practice Community Size

Procedure	% of Physicians Performing Procedure (n=297)* by Community Population			
	<5000	5000-25,000	25,000-100,000	>100,000
Excision of benign skin lesions	98.3	96.5	95.7	89.9
Excision of malignant skin lesions <2 cm†	78.3	63.5	49.3	38.0
Sigmoidoscopy	60.0	72.9	70.0	64.6
Nonstress obstetrics testing†	66.7	67.1	37.7	40.5
Breast-cyst aspiration†	60.0	56.5	62.3	36.7
Norplant insertion	51.7	43.5	40.6	34.2
Arthrocentesis of joints other than knee	53.3	42.4	36.2	39.2
Spirometry	45.0	51.8	49.3	40.5
Nasolaryngoscopy: indirect†	41.7	32.9	24.6	20.3
Holter monitor†	40.0	29.4	21.7	16.6
Cryotherapy of cervix†	36.7	35.3	29.0	11.4
Tonometry†	35.0	20.0	10.1	16.5
Colposcopy†	33.3	23.5	23.2	11.4
Exercise electrocardiogram or treadmill†	31.7	30.6	14.5	15.2
Vasectomy: traditional†	30.0	25.9	34.8	8.9
Excision of malignant skin lesions >2 cm	21.7	12.9	13.04	7.59
Breast biopsy†	21.7	9.4	7.3	2.5
Neonatal placement of umbilical artery catheter†	20.0	9.4	4.4	3.8

NOTE: Only the procedures performed by more than 20% of physicians in communities of these sizes were included.

*Only 297 of the 325 respondents supplied all the demographic information requested.

†Statistically significant at $P < .05$ level.

($r = -.478$, $P < .05$). Profit also had a marginally positive association with the proportion desiring to learn the procedure ($r = .338$, $P < .1$). However, examination of the data showed that two of the procedures no one reported wanting to learn (excision of benign skin lesions and malignant lesions <2 cm) were already being performed by a majority of respondents. Exclusion of these two procedures resulted in a statistically significant relationship between profitability and desire to learn the procedure. Profit was not related to the current performance of any procedure.

Overall, 34% of the 325 respondents reported that they planned to learn at least one of the procedures listed on the survey, and 57% reported that they had discontinued at least one of the procedures. In examining demographic characteristics of those either planning to learn or discontinuing at least one procedure ($n = 297$), we found no association with either variable in relation to commu-

nity size. Significant associations were found between sex and learning at least one new procedure. Thirty-one (44%) of the 70 women and 71 (31%) of the 227 men reported wanting to learn at least one new procedure ($P < .05$). The mean age of those wanting to learn at least one new procedure was also significantly less than that of respondents not wanting to learn one new procedure (38.9 vs 42.1 years, $P < .001$). In a logistic regression analysis simultaneously controlling for age and sex, only age remained significantly associated with planning to learn a procedure ($P < .05$). Neither age nor sex was associated with having quit at least one procedure.

Discussion

Wisconsin family physicians perform a wide range of tests and procedures in addition to universally performed pro-

Table 4. Statistically Significant Physician Sex Differences in the Performance of Specific Procedures by Family Physicians

Procedures Performed More Often by Female Physicians*	Procedures Performed More Often by Male Physicians*
Colposcopy	Nasalaryngoscopy: direct
Loop electrical excision	Sigmoidoscopy
Cryotherapy of cervix	Treadmill or exercise electrocardiogram
	Holter monitor
	Spirometry
	Vasectomy: no scalpel
	Vasectomy: traditional
	Breast biopsy
	Excision of malignant skin lesions <2 cm
	Arthrocentesis of joints other than knee

*Using Pearson chi-square significant at $P < .05$.

cedures such as Pap smears,³⁻⁵ urinalysis,⁴ and aspiration of the knee joint.^{3,4} The physicians included in this study performed an average of 6.9 different procedures, and as many as 18 of the 27 listed procedures. Nearly all physicians excised benign skin lesions, and more than half of those surveyed performed sigmoidoscopy, small malignant skin lesion excision, breast-cyst aspiration, and obstetrical nonstress testing. Fewer than 5% of physicians performed vascular ultrasound, colonoscopy, esophagoduodenoscopy (EGD), LEEP, no-scalpel vasectomy, or obstetrical ultrasound.

Community size, physician age, and physician sex were all found to have a statistically significantly association with the number of procedures performed ($P < .001$). The association with community size might be expected because specialists are not always readily available in small communities and family physicians often find it easier to obtain hospital privileges for procedures in smaller towns. The community size and procedural profile (Table 3) could provide training guidance to residents who anticipate practicing in a given-sized community.

Younger physicians performed more procedures than older physicians ($P < .001$). Much of the technology enabling office procedures is relatively new, and both the equipment and procedural training have only recently become available in residency training programs. Excluding perceived profitability, age was the only significant demographic correlation to quitting or planning to learn a procedure. Younger physicians planned to learn more procedures than did older physicians ($P < .05$). This trend may be explained by the tendency of young physicians to

expand their practices and repertoire of procedures, whereas older physicians may be decreasing and simplifying their practices and are therefore less likely to purchase new equipment.

Overall, men performed more procedures than women; however, women performed significantly more gynecological procedures than did men. This finding helps to confirm recent studies suggesting that female physicians are more aggressive than male physicians in promoting health maintenance and illness prevention for female patients.⁶ The finding also may explain the preference some women have for female physicians in regard to gynecologic health concerns.

More than 10% of family physicians reported planning to learn colposcopy, Norplant insertion, LEEP, and sigmoidoscopy. A smaller percentage (6% to 10%) of the respondents plan to learn no-scalpel vasectomy, cervical cryotherapy, nasalaryngoscopy, and exercise electrocardiography. Only a small percentage plan to learn the controversial gastrointestinal (GI) procedures, colonoscopy (1.9%) and EGD (2.8%). The desire to learn procedures correlated with profitability at $P < .1$, a relationship which becomes significant ($P < .05$) when we excluded minor skin procedures, which most respondents already perform.

For every family physician still doing neonatal umbilical artery placement and neonatal bladder tap, three had abandoned the procedures. Neonatal bladder catheterization seems to be replacing the bladder tap procedure. Neonatal umbilical artery placement is a time-consuming procedure that is usually performed in the hospital; the increase in physician travel time and time away from the office makes the procedure both inconvenient and less profitable.

A 1982 study of perceived core office procedures for family physicians revealed that faculty, graduates, and residents listed suprapubic tap, indirect laryngoscopy, and tonometry as core procedures while relegating vasectomy to the noncore list.³ A 1988 study of Nebraska family physicians identified tonometry and indirect laryngoscopy as core procedures.⁴ Our results 5 years later indicate that Wisconsin family physicians perform these perceived core skills less frequently than in the past. Tonometry has not been shown to be reliable for detecting glaucoma and is no longer recommended for screening.⁷ This finding and recommendation, however, may be a result of poor equipment maintenance and insufficient training of office personnel. Contrary to the prior studies, vasectomy appears to be an area of growing interest.

Because technologic progress is rapid and the funding environment for health services is in turmoil, it is difficult to predict the relative importance of particular procedures to practicing family physicians. Nevertheless,

there are discernible trends. While Phillips' 1989 survey of family physicians in Washington state produced a somewhat different list of procedures from ours, he also identified a wide variety of procedures and a strong interest among family physicians in learning new procedures, such as colposcopy and sigmoidoscopy.⁵

Some current recommendations may help family physicians decide which procedures are appropriate to include in their practices. These include procedures recommended by national organizations, such as the American Cancer Society (ACS), for the early detection of disease.^{7,8} The ACS recommends screening sigmoidoscopy every 3 to 5 years in patients over age 50.⁸ Since this recommendation applies to a significant portion of patients seen by family physicians, family medicine should consider flexible sigmoidoscopy as a core procedure. Wisconsin physicians seem to recognize the value of this procedure: more than 68% of those surveyed currently perform flexible sigmoidoscopic examinations, and an additional 11.6% plan to add the procedure in the future. Minor skin surgery, including excision of benign lesions, malignant lesions <2 cm, and aspiration of breast cysts, is another core procedure. More than half of the physicians surveyed currently perform these procedures.

Our survey showed a statistically significant negative correlation between the perceived profitability of a procedure and the quit ratio ($r = -.478$, $P < .05$). The profitability of a procedure is clearly an important consideration in our current, primarily fee-for-service medical system. If doing a procedure will produce more income, the physician may be influenced to perform the procedure. High office overhead, debts, or a desire for an affluent lifestyle also influence decisions about procedures. The literature supports the hypothesis that physicians are motivated by economic considerations to perform procedures or to make referrals. Hillman and associates⁹ have shown that physicians who refer patients to radiologists for medical imaging order imaging examinations less frequently than do physicians who provide radiologic services in their own offices. Hemenway and colleagues¹⁰ have shown that, given economic incentives to perform more laboratory tests or record more patient visits, physicians will increase the number of laboratory referrals and patient visits.

In a recent article, Culley¹¹ cited pressures exerted by nonphysician management to meet economic goals in a large, vertically integrated medical care system. Family physicians in the organization generally resisted these efforts, lending support to the growing literature that suggests the cost-efficiency of family physicians.^{12,13} At the same time, a viable practice usually requires sound economic decisions. Although profit is usually the incentive that motivates physicians to invest in capital equipment necessary for certain services, profitability alone should

not determine which procedures physicians perform. However, neither should physicians be driven out of practice by carrying many unprofitable procedures in the service of their communities.

Although survey participants were limited to family physicians residing in Wisconsin, they were nearly equally distributed between urban and rural practice sites and are therefore probably fairly representative of family physicians in general. Another limitation of our study is its focus on a restricted list of 27 commonly performed procedures. The procedures we selected were not generally essential to the practice of a family physician, which limited our ability to detect relationships among performance, learning, quitting, and profit. In addition, we asked only whether the procedure was more profitable than the usual clinical time billed but did not probe into the magnitude of profitability. Thus, we could not distinguish between marginally and highly profitable procedures.

While it is not possible to make further specific recommendations on the basis of this study alone, it seems clear that family physicians want to perform a wide variety of procedures, are already doing so, and will continue to do so. It seems likely that, rather than limiting their repertoire of procedures, family physicians will be performing even more types of procedures in the future. Physicians will continue to explore new procedures, modifying the mix performed according to the characteristics of their own practices and available technology, within the framework of the health care political climate.

This study supports continuing the policy of offering instruction in a wide variety of procedures in residency training programs. The burden of selecting which procedures to emphasize will have to remain with the resident physician guided by faculty. Family physicians in rural practice will need the greatest range of procedural competency, whereas those interested in women's health should consider incorporating training in Norplant insertion, colposcopy, LEEP, and cryotherapy. Other interests will suggest the need for competency in other or additional procedures. It might be beneficial for residency programs to spend more time defining residents' practice preferences and to advise them accordingly.

Family physicians should be careful and judicious in making decisions about which procedures to learn and perform in both training and practice. Economic viability hinges on prudence and thorough market research before investing in expensive equipment. However, because patient safety takes precedence over all other considerations, adequate training and sufficient practice volume to maintain skills remain important issues.

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