Elective Foot Surgery: Relative Roles of Doctors of Podiatric Medicine and Orthopedic Surgeons

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Abstract: We examined the roles of Doctors of Podiatric Medicine (DPMs) and orthopedic surgeons in the provision of foot surgery by analyzing the 1982 computerized claims of over 1.1 million federal employees, retirees, and family members. We found that DPMs provided over 60 per cent of all elective insured foot surgery. Without being able to adjust for the severity of the patient's underlying condition or the appropriateness and outcome of the surgery, the average per procedure charge submitted by an orthopedist was 17 per cent higher than that of a DPM; orthopedists were five times as likely to perform a procedure on an inpatient basis, and admitted patients to a hospital had longer stays; DPMs perform a greater number of procedures per episode, but their overall charges during the average foot surgery episode were 30 per cent lower, primarily because of their lower hospitalization rates. The possible impact of recent changes in health care delivery on the DPM/orthopedist practice comparison are discussed as are several questions regarding the quality and need of the care provided by these two groups. (*Am J Public Health* 1987; 77:987–992.)

Introduction

During the average day, Americans will take approximately two trillion steps; each footfall will exert a force three times that of a person's body weight. Although foot care attracts little attention in health policy debate, to the 10 per cent of all Americans and the 25 per cent of all elderly Americans reporting a foot problem,[1] such a problem adversely affects their daily lives, limiting functional capacity and range of activities. Moreover, the delivery of foot care is a major enterprise. It is estimated that over 50 million services are provided annually to persons with foot and ankle problems.[2] Of these contacts, approximately 5 per cent, or 2.5 million, involve foot/ankle surgery of the bone, muscle or nail. The annual cost of this surgery alone is estimated at $4 billion.

Doctors of Podiatric Medicine (DPMs) and orthopedic surgeons provide surgical care of the foot, in both inpatient and ambulatory care settings. The appropriate roles of these two professions has been the subject of considerable controversy.[3,4] In the current era of cost containment and expanding health manpower supply, the practices of these provider groups need to be examined in terms of their implications for the efficiency and effectiveness of US health care. That is the purpose of this study.

In all states, podiatrists are licensed to perform surgery on the foot and in several states they are permitted to operate up to the knee.[5] The entry of the podiatrist into the hospital has involved protracted and sometimes bitter confrontations.[3,6,7] In many cases, DPMs have gained this access through litigation. Today, in all but 14 states, regulations allow, or mandate, full medical staff privileges for podiatrists. In 1974, 44 per cent of all DPMs had such privileges.[8] By 1984, there had been an increase; with 54 per cent having full medical privileges and another 19 per cent having limited privileges.[9] In many cases, full privileges allow DPMs to admit patients and perform surgery as independent providers. The 10,500 DPMS practicing in the US are likely to continue increasing their hospital involvement.

Of the approximately 17 million encounters patients make for foot problems each year to MDs or Doctors of Osteopathy (DOs), the majority are to general/family practitioners and orthopedists.[10] A large proportion (50 per cent) of the foot care provided by MDs relates to foot trauma including: fractures, sprains, and lacerations.[10] While family practitioners provide about 40 per cent of all MD foot care, this care represents a small proportion of their total practice (3 per cent). For orthopedists, however, it has been estimated that as much as 20 per cent of their patient visits involve the treatment of foot and ankle-related problems.[10,11] Furthermore, a recent survey of orthopedic surgeons suggests that 26 per cent of the 16,000 practicing members of that specialty view the foot as a major area of sub-specialization.[12] With regard to MD-performed elective foot surgery involving areas other than the nail, it is believed that the majority of this care is provided by the orthopedist.[1]

Almost no empirical evidence has been available to describe the provision of foot surgery in the US health system.[13,14] Many unanswered questions exist regarding the implications of provider practice on cost, quality, and accessibility of foot care. To address these and other issues, the American Podiatric Medical Association (APMA) sponsored an independent third-party study,[15] a part of which is reported here.

Methods

Our major source of surgical practice and charge information was the computerized insurance records of federal employees insured through the Federal Employee Health Benefit Program (FEHBP). Claims histories were abstracted for over 1.1 million federal employees, retirees, and family members insured by the Aetna Insurance Company. This indemnity plan covered 80 per cent of all costs for surgery after a yearly deductible of $200 had been reached. The Aetna program included a large proportion of federal retirees who relied on this private "medi-gap" coverage to supplement Medicare. All claims for this over 65 age group (including Medicare claims) were submitted to the Aetna and were thus available to us.

For calendar year 1982, about 6 million FEHBP claims records were obtained from the Aetna Insurance Company without personal identifiers. From these records, professional charge transactions for surgical services relating to the foot

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were selected on the basis of Current Procedural Terminology (CPT) codes.[16] Over 21,000 surgical claims made by 12,000 individuals, for services provided by 6,000 different practitioners, were identified; claims were also selected for related services (e.g., hospital care, x-rays). For purposes of analysis, more than 200 CPT codes covering foot/ankle surgery were combined to form 13 clinically logical groupings. Within each group, the distribution of specific codes was similar for both DPMs and MDs. Treatment of trauma-induced fractures represented one group, but detailed analysis of this group was beyond the scope of this study, as elective procedures were of primary interest.

For the majority of claims (over 90 per cent), the record indicated the type of practitioner providing the service (DPM, MD, DO), but it did not include information on specialty. To identify all orthopedic surgeons (both board certified and self-designated), the "Directory of Medical Specialists" and the "American Medical Directory" were used.[17,18] All MDs who were not identified as orthopedists in these rosters, and those whose names and addresses were not available (approximately 10 per cent) were grouped in an "other-MD" category; it is believed that this group consisted mainly of general surgeons and family practitioners. DOs provided one-half of 1 per cent of the surgical service and were excluded from the analysis.

The specialty identification approach allowed a high degree of labeling accuracy for those physicians designated as orthopedists and, given the comprehensiveness of sources used, it is believed that the problem of "false-negatives" (i.e., orthopedists who were missed) is minimal. Also, when the "MD" claims were searched, any DPM misdesignated as an "MD" was identified and relabeled if the provider did not appear on the MD rosters, but did appear on a national list of DPMs. A similar reliability check assessed whether any MDs were miscategorized as "DPMs". In a random sample of claims selected, all "DPMs" identified in the original claims file did appear in an APMA roster of US podiatrists.

As is the case for most insurance data systems, the records available to this study were at the claims transaction level. These individual records were used to construct episodes of all surgically related services provided during a given time period. All surgery performed between admission to and discharge from a hospital was considered part of the same inpatient episode, as were all other services provided to the patient during that same period. Ambulatory procedures performed on the same day, and non-surgical services billed for that day, were considered part of a single-day ambulatory episode. To account for multi-day ambulatory episodes, these "daily records" were linked to one another and considered part of the same episode if they occurred within two months of one another. Using this definition, only 5 per cent of all ambulatory episodes involved surgery on more than one day. Sensitivity analyses assessed the impact of adopting alternative episode definitions, including different time periods and multi-setting (i.e., combined ambulatory and inpatient) episodes. The effects of applying these alternatives was negligible. Using the episode construction methodology, over 1,000 inpatient and 2,800 ambulatory surgical episodes were constructed, with each representing about 1.5 separate foot-related procedures.

While each episode consisted of at least one instance of foot surgery, several different foot-related procedures may have been performed—some by "lead surgeons" and others by "assisting surgeons". These assistant surgeon procedures were considered in charge analyses but not in the procedure per episode counts. When more than one procedure was performed by a lead surgeon, it was not possible to accurately determine which if any of these procedures was secondary to the other. Therefore, analyses that focused on specific procedures assumed that the procedure of interest was "primary" and other procedures were "secondary".

Several sources of information were used as explanatory variables (independent variables) in some analyses. The 1982 characteristics of health care personnel, facilities, and population in all metropolitan and rural areas of the country were obtained from the US Department of Health and Human Services Area Resource File (ARF).[19] This database collects data from a variety of original sources. For example, it includes county level information on all physicians in the US as developed by the American Medical Association (AMA). Additionally, a range of data were obtained from the APMA describing podiatrists and laws that affect the practice of podiatric medicine in all areas of the country. These characteristics of the market in which providers practice were linked into the individual insurance claims record, using postal zip codes. Market areas were defined on the basis of federal Metropolitan Statistical Areas (MSAs). All non-MSA (rural) areas within a given state were considered part of the same market.

To assess the inter-relation and possible competitive effects of the practitioners in a specific locale, an econometric model was estimated using the individual patient claim for major elective surgery (excluding nail and fracture-related procedures) as the unit of analysis. A linear probability model was estimated to assess the effects of a multiple array of factors on the patient's choice of provider using ordinary least squares. The dependent variable was defined as dichotomous, where the selection of a DPM as the primary surgeon was defined as one, and zero otherwise. An ordinary least squares model was adopted given that the probability of selecting a DPM (65 per cent) fell within the range (between 30 and 70 per cent) for which logistic and linear regression models will produce similar estimates.[20] The independent variables included in the model were the age and sex of the patient, per capita income and population density of the market area, measures of manpower availability in the area (expressed in terms of providers per 100,000 population) for orthopedists, DPMs, general practitioners and general surgeons, presence of restrictive state regulations affecting DPMs (such as limitations of practice scope and use of general anesthesia), and regional dummies for each of the nine major US census regions.

Regressions were also used to adjust average surgical episode charges for case mix and geography. Regional variation across the nine US census regions and differences in the types of procedures (based on the 13 CPT groupings) performed by DPMs and orthopedists were taken into account by this multivariate statistical approach.

National incidence of foot surgery was estimated based on the 1982 use patterns of the federal employees and retirees. Given that the FEHBP group included a larger proportion of elderly than the population as a whole, these rates were calculated using a direct adjustment method, based on the 1986 age-sex distribution of the US.

Results

The estimated annual incidence of foot surgery in the US population is presented in Table 1. This table suggests that the most prevalent type of foot surgery involves the toe nail. The most common single procedure in this category was

TABLE 1—Estimated 1986 Incidence of Foot/Ankle Surgery in US and Market Share by Provider Type

Procedures	Annual Procedures per 100,000 Persons	Per Cent of Market Share by Type of Provider		
		DPM	Orthopedic Surgeon	Other MD*
Toe Nail-Related	304	70	1	29
Osseous Procedures Relating to Bunions and Hallux Valgus	164	60	24	16
Excision of Tumor	144	60	19	21
Osseous Procedures to Correct Digits	140	76	8	16
Corrective Procedures Involving Bone Removal	120	67	17	16
Corrective Procedure of Soft Tissue	75	67	13	20
Osseous Procedures to Correct Metatarsals	41	76	12	12
Amputations (of toes)	16	6	—94**—	
Other Procedures	103	54	18	28
Total Above Procedures	1107	64	13	23
Total Including Fractures***	1232	57	—43**—	

*Included MDs who are not orthopedists and MDs with unknown specialty; see text.
**Orthopedist/Other MD split not known.
***Treatment of Fractures not considered as foot surgery; see text.
NOTE: Estimated from 1982 claims records of 1.2 federal employees and retirees. Adjusted to represent age, sex characteristics of 1986 US population.

excision of the nail. It should be noted that the incidence of all types of foot surgery among the FEHBP population evidenced extreme variation for different age and sex subgroups. Overall, women were almost three times as likely to undergo a procedure as men, and the elderly (over age 65) were 2.5 times more likely to undergo a procedure than the non-elderly.

For all but one of the nine elective procedure categories presented in Table 1, the podiatrist is responsible for providing the majority of the surgery. Only in the case of amputations is the majority of surgery performed by MDs. DPMs are estimated to be responsible for 64 per cent of all foot surgery (excluding fractures). Of the remaining 36 per cent of the market, orthopedists provided 13 per cent, and non-orthopedist MDs 23 per cent.

Fracture-related foot procedures accounted for an estimated annual incidence of 125 per 100,000 US population, of which 93 per cent are treated by MDs. With the inclusion of trauma care, the national market share of podiatrists decreases to an estimated 57 per cent.

Because of the uncertainty of the claims file-based specialty designation of the nonorthopedist-MD, and because of the prominence of the orthopedist in the provision of foot surgery, the remainder of the results section focuses on a comparison of orthopedic surgeons and DPMs.

Table 2 provides a comparison of the surgical episode practice characteristics of the two provider groups of principal concern for six major elective surgical categories (toe nail-related surgery and amputations have been excluded). Overall, for all such surgery provided to the FEHBP population, the orthopedic surgeon was five times as likely to rely on the inpatient setting as was the DPM. Within specific categories of surgery, the orthopedists' hospitalization of cases ranged from 5.6 (for soft tissue surgery) to 2.5 (for bunion-related procedures) times that of DPMs. Whether or not the morbidities treated by the orthopedists are of greater severity than those cared for by DPMs is not known, but the average age of each provider's inpatients was comparable (55 years); for patients treated in the ambulatory setting, the orthopedists' patients were younger than those of the DPMs (52 years vs 55 years). The patients treated by orthopedists underwent fewer procedures than did DPM's hospitalized patients. On an overall basis, and for each procedure, the length of stay (LOS) of orthopedists' patients was longer than those of DPMs. For patients treated on an ambulatory basis, the DPM's episodes had a considerably higher likelihood of involving more than one day of surgery and included a larger number of procedures per episode.

Analyses of all claims submitted to the insurance company were performed before charges were deflated for "usual and customary" rate limitations or deductibles. It was not possible to assess costs related to each episode for items/services not covered by the insurance company (e.g., drugs). The analysis of charges focused on two major components of the episode: charges submitted by the surgeon for the performance of foot related procedures; and all other non-surgical charges. In the case of the inpatient episodes, these other charges primarily reflect hospital room and board, ancillaries and "professional services" other than the foot surgery itself (e.g., medical visits, and anesthesia). Table 3 presents a comparison of the average submitted charge for surgery provided by podiatric and orthopedic surgeons. The per-procedure charges submitted by the two provider types were reasonably comparable. The bottom row in this column presents a comparison of charges across all claims. These charges are adjusted for differing case mix (i.e., procedure type) and geographic distribution of the two provider groups, but not for potential differences in the severity of the conditions among the patients treated. The figures of $296 for DPMs and $346 for orthopedists represent the average charge of each provider type, if all foot surgery received by the entire FEHBP group were performed only by that provider. These figures are lower than the average charges for the "major" surgery categories in the preceding rows of Table 3, as they also include minor elective surgery (e.g., nail surgery) which accounts for over a quarter of all nine elective procedures and is almost all performed by podiatrists.

The second column of Table 3 indicates that for all but one category of surgery for hospitalized patients, and on an overall basis, the podiatrists' episodes were more costly. The main source of this cost difference is the higher number of procedures performed per DPM episode and the greater participation of assistant surgeons (32 per cent of DPM hospital episodes involved assisting surgeons vs 11 per cent for orthopedists). The non-surgical charges associated with the DPM episodes were slightly lower than for orthopedist episodes, due to the shorter LOS experienced by the DPM's patients. The regression adjusted average total charges suggest that the average hospital case under the care of a DPM had 7 per cent higher total charges. Statistical techniques used to calculate these averages did not adjust for the number of distinct (billable) procedures performed during each episode, thereby assuming that this number is determined by the surgeon and not by the patient's condition. If one were to consider this assumption incorrect, and also include adjustments for the number of procedures, then the overall charges associated with each DPM hospital case would be 3 per cent lower than those of orthopedists.

The third column of Table 3 suggests that on average, the total costs associated with each ambulatory episode were 25 per cent more costly when an orthopedic surgeon provided

TABLE 2—A Comparison of Foot Surgery Practice Patterns of Podiatrists and Orthopedists by Procedure Category

Procedure Category/Provider		Per Cent of Surgical Episodes Hospitalized	Average Number of Procedures per Inpatient Episode*	Length of Stay for Hospital Episodes (Days)	Average Number Procedures per Ambulatory Episode*	Per Cent of Ambulatory Episodes >1 day
Bunion-Related	DPM	38	2.1	3.5	1.9	11
	Ortho	93	1.5	5.1	1.0	0
Tumor Excision	DPM	19	2.2	4.1	1.6	4
	Ortho	64	1.4	4.8	1.2	2
Digit Correction	DPM	18	3.2	3.8	1.9	7
	Ortho	63	2.3	5.3	1.1	13
Corrective Bone Removal	DPM	16	2.6	3.5	1.6	6
	Ortho	74	2.0	6.6	1.5	8
Soft Tissue	DPM	15	3.5	3.6	1.9	18
	Ortho	84	1.4	5.4	1.1	0
Metatarsal	DPM	30	2.9	3.4	1.2	14
	Ortho	87	2.2	4.6	1.0	0
All**	DPM	15	1.9	3.7	1.4	5
	Ortho	75	1.3	5.3	1.1	2

*Includes both procedures of type noted at left (which are considered "primary") and all other "secondary" procedures performed during the same episode. Does not include procedures by "assistant" surgeons.

**Includes all procedures above and other non-fracture procedures on Table 1. Not adjusted for case-mix.

TABLE 3—A Comparison of Charges Associated with Foot Surgery as Provided by Podiatrists and Orthopedists*

Procedure Category/ Provider		Average Professional Charge ($) Per Procedure All-Settings	Average Total Charge ($) Associated with In-Patient Episodes**	Average Total Charge ($) Associated with Ambulatory Episode**	Average Total Charge ($) Per Episode (Both Settings Combined)
Bunion-Related	DPM	756 (1.04)	4198 (1.16)	1559 (1.20)	2616 (.79)
	Ortho	726	3617	1301	3329
Tumor Excision	DPM	340 (.90)	3964 (1.38)	843 (.80)	1602 (.69)
	Ortho	378	2863	1054	2314
Digit Correction	DPM	344 (1.24)	4668 (1.20)	1050 (1.58)	1926 (.62)
	Ortho	278	3888	663	3114
Correction with Bone Removal	DPM	383 (1.05)	4200 (.90)	933 (.92)	1709 (.48)
	Ortho	366	4656	1019	3586
Soft Tissue	DPM	298 (.89)	4745 (1.35)	1129 (1.31)	1738 (.63)
	Ortho	336	3503	859	2761
Metatarsal	DPM	469 (1.08)	4461 (1.17)	1545 (1.14)	2577 (.80)
	Ortho	436	3805	1356	3227
All***	DPM	296 (.86)	3825 (1.07)	723 (.80)	2045 (.67)
	Ortho	346	3572	906	3041

*All whole numbers represent average national submitted charges in 1982 dollars. Figures in parentheses represent the ratio of the DPM to orthopedist charge.

**Includes professional charges paid to surgeons and all other insured charges (e.g., hospital and ancillary).

***First three columns in this last row represent adjusted average for six procedure categories above and all other non-fracture procedures on Table 1. The fourth column in this row represents the adjusted average for only the above six "major" procedure categories. Figures in this row only are adjusted for case-mix and geography (number of procedures per episode not adjusted for—see text.)

the care. If number of separate procedures were included in the adjustment process, the cross-provider charge difference would increase slightly, with the orthopedist being 30 per cent more costly than the DPM.

A multivariate analyses was undertaken to identify factors associated with a consumer's selection of a podiatrist or MD as surgeon. The use of regression analysis made it possible to assess those characteristics of the patients, or the market in which they resided, that were associated with their choice. The unit of analysis was the FEHBP-insured patient receiving elective major foot surgery (i.e., excluding nail and trauma procedures) during the 1982 period. The results indicate (Table 4) that of the factors included in the model (as noted earlier) the following were independently associated with an increased probability of a consumer receiving surgery from a DPM: the patient being older; a higher podiatrist to population ratio in an area; a lower orthopedist to population ratio in an area; and permissive regulations pertaining to podiatric medicine in the state in which the patient lived.

Discussion

This study has directed attention to the two major provider groups who share responsibilities for surgical treatment of lower extremities, more specifically the foot. Examined in this article are three aspects of practice: professional fees, use of the inpatient surgical environment versus the outpatient, and total expenditures for an episode of care. The results are relevant to the US medical care system as it moves ahead with competitive approaches to cost containment. Without being able to adjust for the need and outcome of the

TABLE 4—Effects of Selected Factors on the Choice of a DPM as Provider of Foot Surgery*

Independent Variable	Ordinary Least Squares Coefficient	Standard Error
Patient Age	.0007	.0004
DPM/100,000 population in area	.0294	.0051
Orthopedist/100,000 population in area	−.0071	.0048
Presence of state regulations limiting DPM scope of practice (1 = Yes)	−.0533	.0269
Presence of state regulations limiting DPM use of anesthesia (1 = Yes)	−.0823	.0225

R^2 .0367
N = 4492
*For major elective surgery (excluding nail- and fracture-related procedures). Dependent variable defined as one for DPM and zero for MD. Other independent variables were included in model (see text).

surgery, we found that, in 1982, the professional fees of orthopedists were somewhat higher than DPMs (by 17 per cent), as were the proportion of cases performed on an inpatient basis. In examining the number of procedures done during a single episode of care, we found that the podiatrist performs more procedures than does the orthopedist (by 30 per cent). The aggregate cost comparison, based on billed charges and without adjustment for patient severity, shows the podiatrist to be less expensive because of fewer admissions to hospitals and greater use of outpatient surgery.

The Aetna FEHBP insurance records were well suited to this analysis, but several limitations should be considered when interpreting the findings. These limitations relate to the characteristics of the study population and to general difficulties encountered in the application of any claims-based data. While the federal employees enrolled with the Aetna in 1982 represent a diverse population, this group is likely to include proportionally more "white collar" workers than in a completely representative national population. Given the possibility of increased foot problems among "blue collar" employees, the FEHBP group may have experienced a somewhat lower incidence of foot problems and subsequent foot surgery. The population is not likely to be representative of the poor or near poor, many of whom are covered by Medicaid or uninsured. While it is not known if these individuals have either a higher or lower incidence of foot problems, in general, the poor have lower health status levels. Moreover, it is evident that those persons without surgical insurance coverage (about 20 per cent of the US population) would not be as likely to obtain foot surgery. These differences may also affect the market share measures, but direction and magnitude of bias are uncertain.

The FEHBP beneficiaries resided in all states, and in both urban and rural areas, but their distribution is skewed toward certain urban areas in several "states" (California, Texas, Virginia, Maryland, Florida, District of Columbia). Most urban areas, and five of the six regions identified above, have a higher than average availability of DPMs. While charges were adjusted for geography, this distributional bias may have inflated the market share reported for podiatrists. Moreover, the utilization of services generally increases with availability of providers; the study population's distributional bias may therefore also have inflated the observed incidence of surgery relative to the true US average.

Any insurance based study is subject to problems inherent in the reliance on claims records. For example, services provided, but not submitted for reimbursement, are not captured by the system. While this source of error is likely to affect the records used in this analysis to some degree, the extent of the problem is believed to be modest. Although non-procedural foot care and minor procedures (e.g., treatment of calluses) are usually not covered by the FEHBP program, those procedures identified by this study were reimbursable. It can be expected, therefore, that claims for these services were submitted for payment with a high degree of regularity. Additionally, because of the relatively high charges associated with even the least expensive of the procedures under review, it is unlikely that many claims went unsubmitted because of underspending the annual deductible threshold of $200 per person. It is likely, however, that the reported claims-based incidence figures slightly underrepresent the true population incidence. Incidence figures that differ slightly from the actual incidence of the population would not be expected to have a significant effect on the accuracy of the study's practice pattern or cost findings, however.

Since 1982, major new initiatives in health care financing and organization have potentially decreased the ratio of inpatient to outpatient surgery of both providers. In most areas, Medicare and other insurers now mandate that many foot procedures be provided in the ambulatory environment. Also, health maintenance organizations (HMOs) and preferred provider organizations (PPOs) are proliferating and the evidence suggests that less inpatient surgery is received by patients enrolled in these organizations.[21] Whether these potential pressures will differentially affect the hospital reliance of either DPMs or orthopedists, and the extent to which such a difference would affect 1982 charge comparisons, are unclear.

In 1982, among the study population, each surgical episode treated by a DPM cost approximately two-thirds as much as when provided by an orthopedist. However, this comparison involves a major caveat; that of patient comparability and the need and outcome of surgery. Although this analysis attempted to provide adjustment for procedure complexity, the comparability of the underlying patient conditions treated by each provider group can not be assured. Therefore, no interpretation of the cost and practice pattern comparisons of DPMs and orthopedists can be made. An understanding of the reasons for the observed difference awaits further inquiry.

With regard to consumer selection of the podiatrist as surgeon, it is evident that at least among the study population, they have gained acceptance. For all major procedures (excepting the relatively rare and serious amputation), the DPM is more likely to have been chosen by the consumer than any type of MD. Surveys of podiatrists have indicated that only a small percentage (8 per cent) of their patients are referred by MDs or DOs,[5] so it appears that most consumers self-refer to "foot doctors", much in the same way they would to a dentist, optometrist, or family physician. The multivariate analysis suggests that where there is a greater supply of podiatrists, the consumer is more likely to select such a provider for service (an increase in the DPM to population rate of 50 per cent leads to an increased likelihood of selecting a DPM of approximately 15 per cent). However, all else equal, more orthopedists in a region appear to only modestly decrease the likelihood that the DPM will be selected (an increase in the orthopedist to population ratio of 50 per cent leads to a decreased likelihood of approximately 4 per cent). Additionally, study findings suggest that regula-

tion of podiatrists decreases the likelihood that a consumer will select a DPM for surgery. (The presence of each of the studied regulations decreased the likelihood of DPM selection by about 10 per cent.) Overall, results relating to consumer choice indicate that it is likely that the total amount of foot surgery provided, and the proportion performed by DPMs, will increase as the supply of podiatrists expands (a 70 per cent growth in the profession is expected by the year 2000).[22] Likewise, decreasing regulatory barriers would be expected to have the same effect. Although the impact of expanding DPM supply and decreased regulation on overall cost of care is unclear, they could be expected to lead to an increase in overall expenditures for foot surgery.

The demand for foot care is expected to grow rapidly as the number of elderly increases. In planning for the delivery of services to this and other segments of the US population, we should investigate all strategies for making the best use of our existing health personnel resources. These strategies should be guided by cost effectiveness, in tandem with patient access and quality of care considerations. Such criteria must become paramount to any existing inter-professional conflict.

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Call for Mindel Sheps Award Nominations

Nominations are invited for the Mindel C. Sheps Award in mathematical demography and demographic methodology. This biennial award is sponsored jointly by the Population Association of America (PAA) and the School of Public Health of the University of North Carolina. The award, which consists of a certificate and a cash prize of $3,000 will next be made at the PAA Annual Meeting in April 1988.

Individuals should be nominated on the basis of important contributions to knowledge, either in the form of a single piece of work or a continuing record of high accomplishment. The award is intended as an honor for an individual whose future research achievements are likely to continue a past record of excellence, rather than as a tribute to a demographer who is ending an active professional career.

Nominations should include a brief summary of the nominee's work and promise for future contributions, as well as a selective list of positions held, relevant additional biographical information, and principal publications.

The recipient need not be a member of PAA, nor is eligibility confined to residents or citizens of particular countries. Recipients of other awards are eligible, as are persons who have been nominated previously. Nominations should be submitted before December 31, 1987 to: John Bongaarts, Chair, Mindel C. Sheps Award Committee, The Population Council, One Dag Hammarskjold Plaza, New York, NY 10017.