

Procedures Performed by Family Physicians, Internists, and a Medex in a Small Group Practice

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Encounter forms for all patient visits to a small group practice (two internists, three family physicians, and one Medex) were examined retrospectively for October 1979 and January, April, and July 1980. A total of 5,694 patient encounters (2,327 male, 3,367 female) were recorded during the four months studied. Diagnostic and therapeutic procedures were performed on 592 patients (9.6 percent), 321 male and 271 female. The family physicians performed fewer procedures on their patients (6.1, 7.5, and 8.6 percent of the total patients seen). The Medex did 18.4 percent of all office procedures for that time period. The ten most commonly performed procedures included electrocardiogram (ECG), rhythm strip or ambulatory ECG, splint application, suture removal, pulmonary function test, suturing, exercise treadmill test, wart removal, removal of skin lesion or punch biopsy, application or removal of plaster cast, and application of ace wrap, sling, or collar. The majority of the procedures performed by the family physicians were also done by the Medex; however, the diversity of the procedures performed by the family physicians was comparable with that of the internists. There were large economic differences between groups, with the internists having the highest total billings and the Medex the lowest average charge per procedure performed.

The definition of family practice remains in transition. The Virginia study,¹ which identified the most common clinical diagnoses seen in the office setting, has had tremendous educational

significance. Few studies, however, have focused on the development of educational objectives necessary for optimal management of these presenting problems. Scutchfield and Ratcliffe,² in an article on family medicine in the undergraduate medical curriculum, discussed specific clinical objectives in terms of "developing knowledge, skills, and attitudes that allow physicians to provide for the care of 90 percent of the diseases or conditions that affect people." A similar study at the residency level addressed the problem of how to evolve specific goal-oriented objectives.³

Presented in part at the Annual Meeting of the North American Primary Care Research Group, Incline Village, Nevada, March 17-20, 1982. From the Department of Family Practice, School of Medicine, University of Washington, Seattle, Washington. Requests for reprints should be addressed to Dr. C. Richard Kirkwood, Department of Family Medicine RF-30, School of Medicine, University of Washington, Seattle, WA 98195.

To date, however, no one has described the frequency and diversity of diagnostic and therapeutic procedures performed in the office setting. This is an important, although often neglected, aspect of patient care that deserves critical attention at all levels of medical training. A physician's competence in performing procedures often saves the patient unnecessary referrals and the resulting loss of continuity of care. Medical students and residents usually learn specific procedural skills necessary for the care of particular patients. However, there is often little formal instruction and minimal understanding of the nature and frequency of procedures that will be performed routinely in the office setting. This is especially true of those who do most of their training on inpatient services in hospitals. Economically, charges from procedures have a significant effect on practice income and are an important variable in achieving the goal of income parity between specialties.

This study was initiated to investigate the frequency, type, and impact on income of diagnostic and therapeutic procedures performed in a small group practice office setting. The design of the study allows comparison of procedure practice habits of family physicians, internists, and a Medex.

Methods

This was a retrospective study utilizing records from a small, hospital-based group practice in Anacortes, Washington (population 10,000). The community has a diversified economy, with oil refineries, fishing, mill work, boat building, and tourism being the principal industries. The group practice included two internists, three family physicians, and one Medex with 7, 8, 3, 5, 15, and 9 years in practice, respectively. All physicians were residency trained and board certified or eligible. Approximately 60 patients were seen per weekday, and an additional 15 patients were seen on Saturday morning. While the internists did not take care of obstetric patients and infrequently saw pediatric patients, there were no other efforts by the providers to select particular patient populations. The family physicians divided equally an obstetric

practice of 80 deliveries per year, and one internist did all treadmill studies. The Medex saw patients on a semiautonomous basis with little encounter-by-encounter supervision of patients or procedures by the physicians. Few procedures were physician initiated. All providers were in full-time practice.

The group saw a representative sampling of common diseases as compared with published studies.¹ The 50 most common diagnoses for May 1978 to May 1979 for active patients (defined as visiting once during that period) are similar. Thus, marked patient selection bias idiosyncratic to the practice is unlikely. An age-sex distribution profile for the same time frame is included in Figure 1. While typically skewed in the direction of both young and old patients (representative for the county according to the 1980 census), the profile generally reflects those published in the family practice literature. The catchment area for the practice was approximately 20,000 persons, served by several other family physicians, internists, and specialists in the fields of urology, orthopedics, ophthalmology, and general surgery. Anacortes is located 70 miles from a tertiary care center, and the nearest alternate medical care is 20 miles away.

For each patient visit to the practice, the physician or Medex documented the following on a standard encounter form: diagnosis according to ICHPP-2 codes,⁴ extent of visit (brief, limited, intermediate, complete history, and physical examination), diagnostic and therapeutic procedures performed as defined by California Relative Value (CRV) codes, and laboratory tests ordered. In the case of procedures or laboratory tests, the appropriate item or items were checked from a standard list. There was space provided to write in anything not listed. The encounter form was then used as an itemized statement and insurance report, and patients were billed accordingly. Emergency room and hospital encounters were not included in these data.

All encounter forms for October 1979 and January, April, and July 1980 (selected to adjust for seasonal variation) were examined. For each provider tallies were made of total number of patients seen as well as type and number of diagnostic and therapeutic procedures performed. Note was made of any procedure checked on the standard list and any added items. Immunization and subcu-

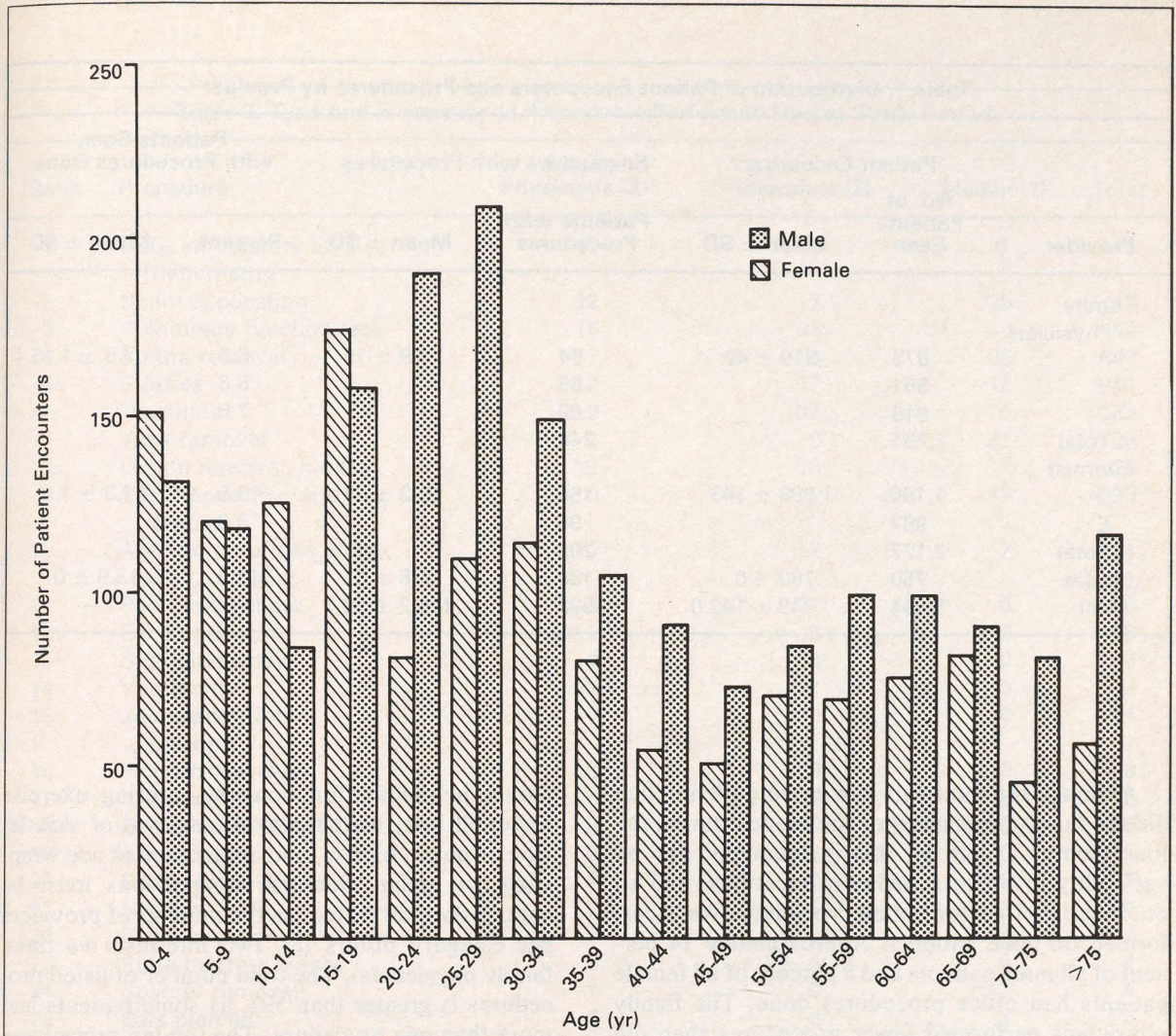


Figure 1. Age-sex profile of practice for all providers, May 15, 1978, to May 14, 1979

taneous or intravenous injections (eg, vitamin B₁₂ shots, allergy shots, chemotherapy injections) were excluded, since they were usually performed by the nursing staff. Laboratory tests such as urinalysis, guaiac tests, pregnancy tests, white blood counts, sedimentation rate, hematocrit, cultures, Monospots, and potassium hydroxide, as well as other tests performed outside the office, were also ignored. Pelvic examinations were not documented and therefore excluded.

Results

Patient visits for the four-month period numbered 5,698, with a male to female ratio of approximately 2 to 3. Approximately 1,400 patients were seen per month, and a stable male to female ratio was observed. Diagnostic or therapeutic procedures were performed on 592 patients (321 male and 271 female) or 10 percent of all patients seen.

Table 1. Distribution of Patient Encounters and Procedures by Provider

Provider	Patient Encounter		Encounters with Procedures		Patients Seen with Procedures Done	
	No. of Patients Seen	Mean \pm SD	Patients with Procedures	Mean \pm SD	Percent	Mean \pm SD
Family Physician						
A	878	919 \pm 42	54	69 \pm 15	6.3	7.5 \pm 1.15
B	961		83		8.6	
C	918		69		7.5	
Total	2,751		248			
Internist						
D	1,190	1,088 \pm 143	150	123 \pm 37	12.6	11.3 \pm 1.9
E	987		96		9.9	
Total	2,177		206			
Medex	760	760 \pm 0	138	138 \pm 0	13.9	13.9 \pm 0
Total	5,694	949 \pm 142.0	592	115.2 \pm 32.7	—	—

Although the internists saw more patients than did the family physicians or the Medex during the four months (Table 1), this is accounted for by variability in office schedules, vacations, and so on. Nearly 54 percent of all procedures were performed on male patients. Approximately 14 percent of all male patients and 8 percent of all female patients had office procedures done. The family physicians performed fewer procedures than did the internists (69 vs 123 procedures per provider). The percent of procedures performed on total patients seen was also lower, however, with the family physicians performing procedures on 7.5 percent of patient encounters, while the internists performed procedures on 11.3 percent. The Medex performed procedures at a higher rate (13.9 percent) of patient encounters.

During the months examined, 36 different procedures were performed on 18.2 percent of patient encounters in this office setting. The procedures and their frequency of occurrence are listed by provider type in Table 2. The totals do not agree with those on Table 1, since they include multiple procedures done on the same patient. The most common diagnostic or therapeutic procedures for the six providers include ECG, rhythm strip or ambulatory ECG, splint application, suture re-

moval, pulmonary function test, suturing, exercise treadmill test, wart removal, removal of skin lesion or punch biopsy, and application of ace wrap, sling, or collar. Subtotal comparisons must be cautiously interpreted, as the number of providers per category differs (ie, two internists vs three family physicians). The total number of listed procedures is greater than 592, as some patients had more than one procedure. The top ten procedures for each provider category are included in Table 3. These lists provide a general notion of the common office procedures performed. The top ten procedures for the family physicians, the internists, and the Medex represent 90 percent, 87 percent, and 99 percent, respectively, of total procedures done. The top six procedures for the family physicians, the internists, and the Medex represent 64 percent, 74 percent, and 91 percent, respectively, of the total procedures performed.

Electrocardiographic interpretations, treadmill testing, vasectomies, pulmonary function testing, and cast application were the top five income procedures, expressed as total billings for each procedure in that order. As compared with ranking by frequency, differences in income generated by provider types were striking. The three family physicians, while performing 35 percent of the pro-

Table 2. Type and Frequency of Procedures Performed During Study Period

Rank	Procedure	Family Physicians (3)*	Internists (2)	Medex (1)	Total
1	ECG, ambulatory ECG rhythm strip	66	80	0	146
2	Splint application	12	7	29	48
3	Pulmonary function test	15	33	0	48
4	Suture removal	17	4	26	47
5	Sutures	12	17	12	41
6	Treadmill	0	37	0	37
7	Wart removal	1	0	35	36
8	Lesion removal, biopsy	12	13	1	26
9	Cast application and removal	6	2	17	25
10	Application of Ace wrap, sling, or collar	10	7	7	24
11	Pacemaker check	3	17	0	20
12	Ear irrigation	11	5	2	18
13	Sigmoidoscopy	4	14	0	18
14	Vasectomy	11	1	0	12
15	Joint aspiration/injection	1	10	0	11
16	Incision/drainage	6	3	0	9
17	IUD insertion	6	2	0	8
18	Endometrial biopsy/D&C	6	0	0	6
19	Anoscopy	2	3	0	5
20	Cervix biopsy/polyp	4	1	0	5
21	Nail trim	2	1	1	4
22	Urine catheter	1	3	0	4
23	Bone marrow biopsy	0	4	0	4
24	Splinter removal	1	0	3	4
25	Ears pierced	0	0	3	3
26	Breast aspiration biopsy	3	0	0	3
27	Circumcision	2	1	0	3
28	Tonometry	2	0	0	2
29	Spinal tap	0	2	0	2
30	Tendon injection	0	1	0	1
31	Phlebotomy	0	1	0	1
32	Nasal cautery	1	0	0	1
33	Foreign body removal (eye)	0	0	1	1
34	Rectal dilation	1	0	0	1
35	Toe reduction	1	0	0	1
36	Suprapubic tap	1	0	0	1
	Total	220	269	138	627
	Mean procedures per provider	69	124	138	99

*Number of providers

Table 3. Top 10 Procedures by Provider Group

Providers and Procedures	Procedures No. (%)	Cumulative Percent
Family physicians		
1 ECG, ambulatory ECG, rhythm strip	66 (31.7)	31.7
2 Suture removal	17 (8.2)	39.9
3 Pulmonary function test	15 (7.2)	47.1
4 Splint application (tie)	12 (5.5)	52.6
Suturing	12 (5.5)	58.1
Lesion removal	12 (5.5)	63.6
7 Ear irrigation (tie)	11 (5.0)	68.6
Vasectomy	11 (5.0)	73.6
9 Application Ace wrap, sling, collar	10 (4.5)	78.1
10 Cast application and removal (tie)	6 (2.7)	80.8
Incision/drainage	6 (2.7)	83.5
IUD insertion	6 (2.7)	86.5
Endometrial biopsy/D&C	6 (2.7)	88.9
Internists		
1 ECG, ambulatory ECG, rhythm strip	80 (29.7)	29.7
2 Treadmill	37 (13.8)	43.5
3 Pulmonary function test	33 (12.3)	55.8
4 Suturing (tie)	17 (6.3)	62.1
Pacemaker check	17 (6.3)	68.4
6 Sigmoidoscopy	14 (5.2)	73.6
7 Lesion removal, biopsy	13 (4.8)	78.4
8 Joint aspiration/injection	10 (3.7)	82.1
9 Application Ace wrap, sling, collar (tie)	7 (2.6)	84.7
Splint application	7 (2.6)	87.3
Medex		
1 Wart removal	35 (25.4)	25.4
2 Splint application	29 (21.0)	46.4
3 Suture removal	26 (18.8)	65.2
4 Cast application and removal	17 (12.3)	77.5
5 Suturing	12 (8.6)	86.1
6 Application Ace wrap, sling, collar	7 (5.1)	91.2
7 Splinter removal (tie)	3 (2.2)	93.4
Ears pierced	3 (2.2)	95.6
9 Ear irrigation	2 (1.4)	97.0
10 Foreign body removal (eye)	1 (<1)	99.0

cedures, generated 34 percent of the income. The Medex performed 22 percent of the procedures, generating 13 percent of the income. The two internists, while performing 43 percent of the procedures, generated 52 percent of the income. The comparison is even more graphic when the type of procedure that generated the bulk of the internists' income is analyzed (Table 4): ECG interpretation, pulmonary function interpretations, treadmill testing, and pacemaker checks made up 76 percent of the internists vs 37 percent of the family physicians' income, yet these procedures are reasonably nondisruptive of office routine and consume relatively little time to perform. Although the Medex performs proportionately more total procedures than the other providers, his contribution emphasizes simple, relatively time-consuming, and disruptive (eg, casts, sutures, warts) procedures, which are considerably less remunerative. The top ten procedures generated 89 and 94 percent of the total procedural income for the internists and Medex, respectively, and only 79 percent of procedural income for family physicians.

Discussion

The practice studied is fairly typical in that the most common diagnoses are comparable to those observed in the Virginia study.¹ The patient male-to-female ratio is also quite similar. It is remarkable that the difference in frequency and diversity of procedures performed by the family physicians and the internists are so small. This reflects a striking similarity in the nature of primary care delivered by the two groups. It is philosophically satisfying in the sense that both specialties are able to serve a common goal in an integrated office setting.

Generally, the majority of the simple procedures (eg, splinting and casting, wart removal) performed by the family physician was also done by the Medex; yet, the diversity of procedures done by the family physician was comparable to and slightly exceeded the internists. Only one common procedure (treadmill exercise stress testing) was done exclusively by internists. Of the 36 different procedures shown in Table 2, the family physicians performed 29, the internists 25, and the

Table 4. Top Income Producers by Provider Type

	Cost per Procedure (\$)
Family Physician	
1 ECG	38.50
2 Vasectomy	202.00
3 Pulmonary function test	48.00
4 Lesion removal	39.00
5 Casting	58.00
6 IUD insertion	53.00
7 Suturing	24.00
8 Ear irrigation	24.00
9 Endometrial biopsy	44.00
10 Pacemaker check	68.00
Total billing for 10 procedures (% of all procedures)	7,532.00 (79%)
Internist	
1 Treadmill	145.00
2 ECG	38.50
3 Pulmonary function test	48.00
4 Pacemaker check	68.00
5 Sigmoidoscopy	39.00
6 Lesion removal	39.00
7 Suturing	24.00
8 Bone marrow	77.50
9 Joint aspiration	24.00
10 Splint application	29.00
Total billing for 10 procedures (% of all procedures)	12,935.00 (89%)
Medex	
1 Casting	58.00
2 Splint	30.00
3 Wart removal	19.00
4 Suture removal	11.50
5 Suturing	24.00
6 Application device	17.00
7 Ear piercing	39.00
8 Splinter removal	24.00
9 Ear irrigation	24.00
Total billing for 9 procedures (% of all procedures)	3,341.00 (94%)

Medex 12. Of course, the diversity of procedures done will vary with the nature of the patient's presenting illness.

Three of the top 10 most common procedures (suturing, lesion removal, and wart removal) are invasive in nature. The Medex performs less-invasive procedures, whereas the internists and family physicians perform more invasive ones. Generally, the less frequently performed procedures are more invasive in character.

Competence in procedural skills does require a measure of diversity, and expertise in the "top 10" to the exclusion of other procedures would not serve either family physicians or internists well. This study draws attention to several procedural skills that should be integrated in medical school and residency training programs. Obviously, the ability to interpret electrocardiograms and pulmonary function tests is important, but the abilities to apply a plaster cast and to suture a laceration are also highly desirable. This study demonstrates that the Medex can be utilized to perform the bulk of simpler, less invasive procedures, thus freeing the physician's time for more invasive and complicated evaluations.

Although the frequency and diversity of procedures performed in this group suggest a close similarity between subgroups of providers, an economic analysis of the data does not. The family physicians generated one half the income per provider for the procedures they performed as compared with the internists (\$3,150 per family physician vs \$7,204 per internist). The average billing per procedure was \$42 per procedure for the family physicians compared with \$54 per procedure for the internists, a smaller but still significant difference. The Medex averaged \$26 for the procedures he performed. Thus much of the difference in income between family physicians and internists is due to the high volume of a relatively select group of procedures coupled with a higher rate of reimbursement per procedure.

Conclusion

The family physician is a specialist in common diseases. It is generally accepted that he or she

will be able to care for 90 to 95 percent of presenting diseases and conditions. Diagnostic and therapeutic procedures performed in evaluation of a particular problem are critical to the quality of services rendered.

Although this study has limited scope in that one small hospital-based group was studied, it does indicate the scope of skills necessary to meet patient needs in primary care. This has important implications educationally in the design of both undergraduate and graduate curricula. Too often the teaching of requisite procedural skills has been left to the traditional "do one, see one, teach one" method, leaving practitioners either uncomfortable or less than well trained. The later situation has negative implications for quality of patient care, the former may lead to unnecessary and possibly more expensive referrals to more highly trained specialists.

Economically it is clear that, at least in this setting, internists are performing more economically advantageous procedures at a slightly higher rate per patient encounter. Additionally, although the Medex is performing more procedures, they are narrower in scope both technically and economically. Further community-based studies on a larger scale are needed to confirm both the diversity and frequency of procedures seen and the economic implications of the comparison between family physicians and internists.

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