

Prescribing Patterns in a Family Medicine Residency Program

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The methodology and results of a concurrent review of prescribing practices in a family practice residency are discussed. A clinical pharmacist reviewed copies of prescriptions returned to him during a six-month period, and he tabulated information to allow comparisons of clinic prescribing patterns with national patterns. Additionally, peer group comparisons within the residency were made. It was found that tricyclic antidepressants were prescribed more frequently than anxiolytic drugs, a distinct difference when compared to national prescribing reports. Peer group comparisons showed apparent autonomy in prescribing habits among residents and faculty, and the drug "repertoire" and number of prescriptions written increased as the number of years in the residency progressed.

"On clinical rounds, a drug is something that enters the discussion of a patient's disorder at the very end as a mysterious but necessary intruder to an otherwise pristine discussion of differential diagnosis or surgical technique."¹ Although this sentiment may be commonly felt, drugs and their proper utilization are an integral part of the education of a family physician. With this in mind, the Providence Family Medical Center Residency Program in Seattle, Washington, made the decision to have clinical pharmacy input in the training of residents. In the fall of 1975, a clinical pharmacist began working an average of 20 hours per week in the clinic, and since that time he has been involved with various tasks in resident education and patient care. The pharmacist made didactic presentations, participated in chart review and

specific topic audits, joined in rounds on clinic patients when in the hospital, and met with drug company representatives and obtained samples of selected drugs for indigent patients. Additionally, the pharmacist worked with health care professional students who spent time in the clinic, and he wrote periodic newsletters with an emphasis on drug topics of interest to family physicians.

One of the responsibilities of the clinical pharmacist was to audit the prescribing practices of the clinic staff (3 faculty physicians, 12 residents, and 1 nurse practitioner). Through the auditing process it was hoped that deficiencies in prescribing would be picked up and appropriate corrective efforts could be made. Possibly of greater interest was that prescribing comparisons could be made between peer groups to see the differences between residents and faculty, and possibly the influences of one on the other could be seen also. Further, comparisons could be made of the most frequently prescribed drugs in this Center with literature reports of national prescribing patterns.

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Name _____

Address _____ Date _____

ICHPPC code _____

B

Sig: _____

Refill 0 1 2 3 4 _____ M.D.

Please Label _____
Please Use Safety Caps _____ DEA _____

Figure 1A. Sample clinic prescription with attached carbonless copy



COPY

PROVIDENCE FAMILY MEDICAL CENTER **COPY** RETURN TO CLINIC PHARMACIST

Figure 1B. Sample copy inserted in public assistance prescriptions

Methods

Every prescribing care provider in the Providence Family Medical Center was given prescription blanks with carbonless copies (Figures 1A and 1B). Copies of written prescriptions were to be

returned to the clinic pharmacist who reviewed each copy to check for legibility, legality, and appropriateness of content. During the period of April 15, 1977 to November 15, 1977, the information from these copies was manually tabulated for retrieval, both by prescriber and by drug

Table 1. Comparison of Providence Family Medical Center's 20 Most Frequently Prescribed Drugs with National Ranking²

Providence Family Medical Center	National Ranking
1. Tetracycline	1. Valium
2. Ampicillin	2. Ampicillin
3. Actifed	3. Lasix
4. AVC	4. Tetracycline
5. Hydrochlorothiazide	5. Aldomet
6. Darvon products	6. HydroDiuril
7. Tylenol with Codeine	7. Premarin
8. Penicillin VK	8. Librium
9. Valium	9. Dimetapp
10. Prenatal vitamins	10. Lanoxin
11. Norinyl 1/50	11. Tylenol with Codeine
12. Sulfonamides (oral)	12. Empirin Compound with Codeine
13. Sinequan	13. Actifed
14. Ferrous Sulfate	14. Motrin
15. Imipramine	15. Darvon Compound-65
16. Erythromycin	16. Dyazide
17. Inderal	17. V-Cillin K
18. Dalmane	18. Darvocet-N
19. Aldomet	19. Dalmane
20. Metronidazole	20. Inderal

prescribed. Data lapses were expected, mainly due to unreturned carbonless copies, telephone prescriptions for which there were no copies, and the dispensing of drug samples where no prescription was written.

The use of drug samples is a commonplace practice elsewhere, and it is doubtful that other prescription studies considered samples as prescriptions "written" for patients, so this does not represent a significant loss of data. Telephone prescriptions have not been separately identified in other prescription studies, making comparison of that data difficult even if the present study had been able to capture that information. It is a clinic policy not to prescribe drugs of possible abuse or renew antibiotics by telephone, and as shown in Table 1, those drug categories represent a large

portion of frequently prescribed drugs. It would be expected that telephone data loss would be relatively small. Thus, the most important data lapse would be those prescription copies not returned to the pharmacist.

To help estimate the prescription copy return rate, a retrospective chart review was done for those patients seen by the highest prescribing resident and lowest prescribing resident (Table 2). All the charts of patients seen by those residents for six clinic sessions per resident (one session per month of the study) were reviewed. Review of the patient charts showed that about the same average number of prescriptions per patient visit were written by the high (35 percent) and low (32 percent) resident. However, the number of copies returned to the pharmacist exceeded what was re-

Table 2. Average Number of Prescriptions/Patient Visit		
Faculty		0.26
(3)		0.41
		0.63
Average		0.41
Third Year Residents		0.48
(3)*		0.24
		0.63
Average		0.44
Second Year Residents		0.43
(4)		0.34
		0.20
		0.14
Average		0.29
First Year Residents		0.37
(4)		0.22
		0.38
		0.45
Average		0.35
Family Nurse Practitioner	Average	0.22
(1)		
*Average for 1 of 4 third year residents was omitted due to insufficient data. National Average Number of Prescriptions/Patient Visit—0.67 prescriptions/visit ³		

corded in the charts. In the case of the lowest prescribing resident, 20 copies were returned in which the patient record review showed only 6 prescriptions written. For the highest prescriber, 18 copies were returned in which patient records showed only 7 prescriptions written. Prescriber cooperation in returning copies was, therefore, approximately equal. This was facilitated by provision of collection boxes in each office in the clinic. After each prescription was written, it was a simple matter to put the copy in the nearby box.

The pharmacist was then able to collect copies from each office.

Following tabulation, data groupings were made in two ways: (1) by prescriber peer groups, such as first year residents and attending faculty; and (2) by pharmacological categories for drugs, such as central nervous system drugs and antibiotics. These groupings allowed the authors to make internal comparisons (eg, first year with third year residents) and external comparisons (clinic prescribing patterns with literature reports).

Results

During the six months of data collection, 1,875 prescription copies were returned to the pharmacist. There were 4,801 clinic visits during this same period, resulting in a clinic average of 0.39 written prescriptions per visit. The National Disease and Therapeutic Index of 1972³ reported that of the 3,000 physicians polled nationwide, two thirds of all outpatient encounters resulted in at least one prescription (average of at least 0.67 prescriptions/visit). Thus, based purely upon returned copies, it would seem that this clinic's use of the prescription pad is well below the national average. When compared by peer group, the faculty and third year residents in this setting average more prescriptions per patient visit than the first and second year residents (Table 2).

In comparing the most frequently prescribed drugs in this setting with nationwide drug prescribing, it can be seen in Table 1 that some very distinct differences appear. Diazepam (Valium) and methyl dopa (Aldomet) were prescribed less frequently than reported in other "top 200 drug" lists, but aminocrine, sulfamilamide, allantoin (AVC), prenatal vitamins, antidepressants, and metronidazole (Flagyl) were prescribed more frequently. Of additional interest, the 20 most frequently prescribed drugs represented 49.5 percent of all written prescriptions in this clinic.

In comparing drug categories prescribed at Providence Family Medical Center with other prescription studies, some interesting differences were noted. Prescriptions for central nervous system drugs totalled 12.3 percent in this setting, compared with 14.1 percent in the 1972 National Disease and Therapeutic Index and 30.4 percent in a British study of general practitioners.⁴ The most striking discovery, however, was that the antidepressant class of drugs was the most frequently prescribed class of central nervous system medications in this clinic. And although diazepam (Valium) holds the top spot as the most frequently prescribed drug nationally, it ranked only ninth in prescribing frequency in the Providence Family Medical Center.

Antibiotic prescriptions represented 24.5 percent and 10.9 percent, respectively, in the US and British studies previously mentioned. The clinic average was 17.3 percent. Tetracycline, ampicillin, and penicillin VK were the most frequently prescribed antibiotics, both nationally and in this

clinic. Metronidazole, 20th most prescribed drug in this clinic, ranked only 133rd in national use.

Comparisons for two other categories, cardiovascular and analgesic drugs, showed no major differences when compared with literature reports.

Peer Group Comparisons

Of particular interest were the comparisons made when peer group prescribing patterns were analyzed. How much influence does the faculty have on resident prescribing habits, and what differences are there among residency years in prescribing patterns?

It was found that there were no *evident* influences of the faculty on the prescribing habits of the residents in this study. In fact, there were discrete differences showing independent prescribing habits for the residents when compared with the faculty. For example, the three faculty physicians prescribed five times as much erythromycin than the combined total prescribed by the 12 residents. Penicillin VK was prescribed 2.5 times more frequently by the faculty than by the next closest peer grouping (second year residents). But for metronidazole, the resident peer groups prescribed more than the faculty. Apparent resident prescribing autonomy was further supported when certain drugs which were commonly prescribed by the faculty failed to appear in the routine prescribing of any of the residency groups.

The greater clinical experience of the prescribers was evident in the larger drug repertoire of each group. In general, the faculty prescribed about twice as many different drug entities as the first year residents. This difference narrowed in the second and third years.

The number of prescriptions per patient visit was determined, but no trend by peer grouping was found. The highest rate was 0.63 prescriptions/visit (for an attending physician and a third year resident).

In general, errors in prescription writing were very low in all groups. Omissions (drug amount, refill instructions, DEA [Drug Enforcement Administration] number) were greater in prescriptions written by first year residents. In the total 1,875 prescriptions, only one prescription was potentially dangerous if it had been filled as written.

Discussion

There would seem to be value in auditing prescribing habits during the three years of residency training. The skills of prescribing and proper drug utilization develop much like other skills in training, and prescription monitoring represents a form of concurrent utilization review. The information obtained can be used to assess the development of prescribing skills, and further, variances from literature reports can be analyzed. Additionally, the knowledge that prescription review is ongoing probably has some influence upon the residents' prescribing practices.

Manual data retrieval and analysis are extremely time consuming, making the cost of maintaining a continuous audit prohibitive. Automated means of data retrieval and analysis would be most desirable, but periodic "spot checks" by manual retrieval could still provide some useful information at a reduced cost. Longitudinal follow-up of Providence residents through the years of their training will utilize periodic "spot checks," although copies of all prescriptions will continue to be made available for thorough auditing if resources permit.

The results of the present audit prompted speculation among the staff about the differences in drug prescribing both by peer groups within the clinic and in comparison with literature reports. There was a decided clinic preference for tricyclic antidepressants over benzodiazepines (Valium, Librium). This was believed to be an indication of this site's recognition of the potential traps associated with benzodiazepine over-prescribing as well as an increasing awareness that depression is often the source for many somatic complaints seen in the family physician's office.

Antibiotic prescribing differences between faculty and residents were thought to be due to the different patient populations seen by each. The faculty's patients are generally older and have more pulmonary problems (thus, higher tetracycline and erythromycin use), while the residents' patients were thought to be predominantly children and young females (thus, more ampicillin use). This difference in patient populations may also explain the finding that the faculty wrote far more refills on their prescriptions (for chronic drugs) than did the residents.

Of passing interest is that there appeared to be sporadic prescribing of certain drugs. For exam-

ple, during one day in the office, one physician wrote predominantly ampicillin prescriptions, then on another day, mainly oral contraceptives, and on another day, mainly metronidazole (Flagyl).

Summary

Prescribing patterns can be monitored by reviewing copies of prescriptions written in the clinic. There is some utility in analyzing prescribing patterns in an educational setting such as a family practice residency. Although not intended, the very fact that prescription monitoring is ongoing probably has a positive influence upon prescribing patterns. Data comparisons allow speculation as to why clinic peer groups might prescribe differently, and future audits might show the prescribing changes occurring with experience through the years of residency training.

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