Family Practice in Virginia: A Comparative Analysis of Two Years' Data

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Data representing Fiscal Years 1975 and 1976 as well as the aggregate 1975-1976 data set are reviewed in this paper.

Information on 92,410 discrete patients and the 333,709 transactions they generated is studied. The transactions per patient rate of 3.6 varies greatly among the eight practices under investigation. This interpractice variation is complemented by remarkable year-to-year consistency within each practice. Age and the percent of continuing patients are presented as possible explanations for this variation. These data are useful to the physician in identifying the high-use patients and to the health planner for manpower and funding appropriations.

This paper will present a summary of the analysis performed on the data collected from the Medical College of Virginia (MCV) Family Practice Data System during the period July 1, 1974-June 30, 1976. This analysis depicts the comparison among and within practices over these two years. Particular focus will be placed on the temporal consistency of the data and the evaluation of interpractice variation in the utilization of the health services. Basic characteristics of the combined two years of data as well as characteristics for each separate year are also considered. To facilitate this investigation, eight practices which recorded in both fiscal years are considered. Only through the collection of such longitudinal data is this type of analysis possible. It should be noted, however, that comparisons made between practices are not standardized due to the lack of precise estimates of the size of the population at risk in the practices, and any inferences to be drawn from this analysis should therefore be done with caution.

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MCV Family Practice Data System

The MCV Family Practice Data System is a continuous recording process established to collect basic information on all patients seen and all problems evaluated by participating physicians throughout Virginia. Actual recording began in July 1973 in three "teaching" practices affiliated with the Department of Family Practice, Medical College of Virginia, and has grown to include five such teaching practices and 13 community practices serving both urban and rural populations with a range of demographic and socioeconomic characteristics.

The paper will be concerned with the Physician's Daily Worksheet, one component of the system. This sheet is a daily appointment listing converted to a format which can be easily keypunched for computer input. Records collected from the inception of the system through August 1, 1975 have been presented previously by Marsland, Wood, and Mayo.[1]

In an attempt to achieve acceptance and uniform usage of terms relevant to the analysis of primary care data, the following will be used in the context of this paper:

Visit—a face-to-face contact between health-care provider and patient, at any location, at which one or more transactions are completed.

Transaction—the identification and recording of a unique problem by the health-care provider at a visit.

Current patient—an individual for whom a chart has been prepared and who has received professional advice or services from the practice *in the past year.*

The two fiscal years (FY) of data being considered in this analysis are FY75 (July 1, 1974-June 30, 1975) and FY76 (July 1, 1975-June 30, 1976). In those two years, 391,170 transactions were recorded using the Royal College of General Practitioners-United States (RCGP-US) classification system. As was mentioned, this analysis involves longitudinal data collected from eight practices that recorded in both years, accounting for 333,709 transactions over the two-year period, or 86 percent of the total.

Three measures of morbidity and health-care utilization will be considered as a basis of comparison: (1) transactions per (current) patient, (2) visits per (current) patient, and (3) transactions per visit.

Analysis and Discussion

Table 1 presents a summary of the overall frequencies and usage rates for the two-year period being examined. It appears that there was very little change from year to year, as the FY75 and FY76 totals are almost identical for all three parameters being considered. It should be noted that the combined FY75-FY76 values for the transactions and visits per patient are approximately 25 percent higher than the individual yearly values, corroborating the fact that about 25 percent (23,136 of 92,410) of the total number of patients for the combined data set visited a practice in both years of study.

Does this consistency in values from year to year imply a uniform trend in family practice in Virginia? Possibly, but the finding of little aggregate variability between years does not rule out variation from the following two sources: (1) variation among practices within a year, and (2) year to year variation within a practice. Further, such an inference should not be made in the area of health planning. Resource planning in health care should be done at the practice or small-area level as opposed to the aggregate. Marked differences in health-care utilization among localities indicate that application of aggregate rates could result in misappropriations of manpower and/or funds. This concept is now developed in light of the interpractice variation seen in these data.

Table 1. Number of Patients, Visits, and Transactions in the FY75, FY76, and FY75-FY76 Data Sets (Eight Continuing Practices Only)

	FY75	FY76	FY75-FY76
Patients	58,285	57,261	92,410*
Visits	130,009	129,354	259,363
Transactions	166,618	167,091	333,709
Transactions per patient	2.9	2.9	3.6
Visits per patient	2.2	2.3	2.8
Transactions per visit	1.3	1.3	1.3

*Total discrete patients over the two-year period.

First, the distribution of the patient populations among the eight practices will be examined. In Table 1, it was seen that the total number of current patients changed very little from FY75 to FY76. However, Table 2 reveals that some of the practices experienced gains in the number of current patients while others showed decreases from FY75 to FY76. Although this is an example of how practices can vary within a system, no inference can be drawn from it until more information is collected on the size of the total practice population, which includes those who consider themselves members of the practice but do not visit during a given year. Solution of this so-called "denominator problem" would greatly increase the power of these data. For a discussion of the research being done in this area see Garson,[2] Bass,[3] Froom,[4] and Boyle et al.[5]

The frequency of utilization of the practice by the patient population is now considered. Only one measure, *transactions per patient,* will be examined here. Table 3 lists the values of this measure by practice and year. It should be noted that

Table 2. The Distribution of Current Patients Among the Eight Continuing Practices

Practice	Current Patients FY75	Current Patients FY76	Percent Difference
A	11,451	11,860	2.8
B	8,692	8,746	0.6
C	8,026	7,279	−9.3
D	7,408	7,551	1.9
E	4,801	4,403	−8.3
F	4,034	3,315	−17.8
G	7,362	7,204	−2.1
H	6,241	6,903	7.5
Total	58,285	57,261	−1.8

Table 3. Transactions per Patient (TR/P) by Practice for the Eight Continuing Practices FY75, FY76, and FY75-FY76 Data Sets

Practice	TR/P FY75	TR/P FY76	TR/P* FY75-FY76
A	3.5	3.6	4.5
B	3.5	3.7	4.8
C	2.9	2.6	3.4
D	1.8	1.9	2.3
E	1.9	2.2	2.6
F	3.8	3.5	4.3
G	2.1	2.4	2.6
H	3.0	3.0	4.0
Total	2.9	2.9	3.6

*Based on the total number of discrete patients in the practice over the two-year period.

the range represents a twofold difference between the highest and lowest values, marking significant variation among practices. Conversely, there is very slight variation from year to year within practices. The year-to-year consistency in transactions per patient indicates that these rates typify the practice populations as high or low-use groups of patients. How this would be useful in health planning and the study of morbidity may now be examined.

From a predictive standpoint in health planning and from an etiologic standpoint in epidemiology, it is of interest to identify those factors which might cause the outcome to vary in a population. In other words, what patient characteristics are associated with the number of transactions per patient? These then may be the sources of the interpractice variation which has been noted.

When one discusses variation in studies of health care, the primary patient characteristics that are mentioned are age and sex. Table 4 shows that females use the practices' services more often than males. Once again, the values are consistent between years. Since the number of transactions per patient varies with sex, examining the sex ratios among practices can perhaps explain some of the interpractice variation. Not only do females use the services more often, but they make up a majority of the current patient population for each practice. Sex is therefore a possible reason for the different rates among practices.

Age is also an important variable in almost any study related to health. It would be of interest to compare the age distributions of the different practices as was done with sex. In a summary paper such as this, however, the comparison of detailed age distributions among eight practices is not a feasible approach. An alternative method has been developed by noting that in primary care, the high-use patients are located at either end of the age spectrum. Conversely, those patients between 15 and 44 years of age have lower rates than those for patients of all ages. Therefore, by studying how the percentage of patients between 15 and 44 varies among practices, it is possible to study, in a simplified fashion, the effect of age on the number of transactions per patient. Table 5 verifies the difference in rates between age groups. The percentage of patients between 15 and 44 years of age ranged from 39 percent to 60 percent among the eight practices but maintained year-to-year consistency. There is even more dispersion among practices with age than there was with sex, indicating another possible source of the variation.

An additional factor is the number of patients that "continued" or visited in both years. It was mentioned that 25 percent of the total number of patients in the two-year data set had recorded visits during both years under study. These might be the "high users" or the chronically ill patients, and that number in a practice would certainly affect the rate of utilization and morbidity in that

Table 4. The Number of Patients and Transactions per Patient (TR/P) by Sex for the FY75, FY76, and FY75-FY76 Data Sets

Sex	FY75 Patients	FY75 TR/P	FY76 Patients	FY76 TR/P	FY75-FY76 Patients	FY75-FY76 TR/P
Female	32,768	3.1	32,255	3.2	51,210*	4.0
Male	25,517	2.6	25,006	2.6	41,200	3.2
Total	58,285	2.9	57,261	2.9	92,410	3.6

*Total discrete patients over the two-year period.

Table 5. The Number of Patients and Transactions per Patient (TR/P) by Age Group for the FY75, FY76, and FY75-FY76 Data Sets

Age Group	FY75 Patients	FY75 TR/P	FY76 Patients	FY76 TR/P	FY75-FY76 Patients	FY75-FY76 TR/P
15-44	27,659	2.5	26,587	2.5	44,825*	3.0
0-15 and 45+	30,626	3.2	30,674	3.3	47,585	4.2
Total	58,285	2.9	57,261	2.9	92,410	3.6

*Total discrete patients over the two-year period.

practice. Table 6 shows that those patients who visited the practices in both years do have a higher rate of transactions per patient than the patients who recorded in just one year. The combined two-year rate for those continuing patients can be obtained by simply adding the two yearly rates because the denominators are the same. The overall percentage of continuing patients varies from 15 percent to 36 percent among the eight practices, a twofold difference.

Table 7 summarizes the above analysis. Lower transaction-per-patient rates are associated in general with higher percentages of patients between 15 and 44 years of age. A stronger association (positive) is suggested by the comparison of the percentage of patients continuing and the transactions per patient visiting: more patients visiting in both years appears to result in higher rates. The data do not seem to support either a negative or positive association with "the percentage female," even though one would have suspected it initially. This lack of association can be partially explained by the relatively narrow range of variation among practices in the percent female as compared to the percentages related to age and continuing patients. These results warrant further investigation into these factors and the interactions between them.

Summary

The three major concepts apparent in this analysis are: (1) year-to-year consistency of the data, (2) interpractice variation, and (3) the value of longitudinal data.

It is clear that, at both practice and aggregate levels, there is remarkable consistency in the recorded utilization of the services from FY75 to FY76. This constancy is particularly impressive in light of the magnitude of the numbers involved. This should be evidence that the relative numbers and rates are not artifacts of the data, but indeed do typify the practices and subgroups recording in the system. As such, these data can be used as research tools in health services planning. For example, the constancy of transactions per patient would facilitate manpower estimates directly from

Table 6. The Number of Patients and Transactions per Patient (TR/P) for the Continuing and Noncontinuing Patients in the Two Fiscal Years FY75 and FY76

	FY75 Patients	FY75 TR/P	FY76 Patients	FY76 TR/P
Continuing FY75 to FY76	23,136	4.1	23,136	4.0
Noncontinuing, one year of recording only, FY75 or FY76	35,149	2.0	34,125	2.2
Total	58,285	2.9	57,261	2.9

Table 7. The Relationship of Age, Sex, and Continuing Patients to Transactions per Patient (TR/P) by Practice for the FY75-FY76 Data Set

Practice	Total FY75-FY76 Patients	Percent 15-44	Percent Female	Percent Continuing	TR/P
A	18,633	38.9	61.9	25.6	4.5
B	13,037	42.3	53.4	33.8	4.8
C	12,534	60.5	55.1	22.1	3.4
D	12,151	42.3	52.2	23.1	2.3
E	7,335	61.4	59.7	25.5	2.6
F	6,262	60.2	51.6	17.4	4.3
G	12,639	50.5	53.9	15.2	2.6
H	9,819	47.8	51.5	36.0	4.0
Total	92,410	48.5	55.4	25.0	3.6

an increase in the patient population. Also, the individual physician could identify the chronic "over-user" or hypochondriac patient.

The data clearly suggest factors which might be related to or cause variation. Age and the number of continuing patients have been suggested here, but certainly many more factors, such as the individual physician, are involved. The interaction between factors is also an important consideration.

Finally, it should be evident that nothing presented here should be considered complex. The power of the MCV Family Practice Data System lies in the continuous recording of longitudinal data. The more data that can be accumulated on a longitudinal basis (assuming sufficient data quality), the more precisely statistical models can be constructed. As such, the analyses will be more powerful and resultant inferences more reliable. The future of epidemiologic research lies in this type of data recording, and anyone interested in such research should certainly consider continuous data recording to enhance clinical prospective studies, facilitate more efficient study designs, and hence generate more meaningful results.

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