

An Information System for Family Practice

Part 4: Encounter Data and Their Uses

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This paper describes the ways in which encounter data from the family practice teaching units of the Department of Family Medicine, University of Western Ontario, have been used for teaching, service, and research. The fact that family physicians may deal with several problems at one visit is emphasized, as is the need to report morbidity in terms of the population at risk, so that comparisons can be made with other work. The value of encounter data in studies of patient utilization and resident experience is noted. The validity of the data has been examined and the extent of under-recording assessed. The system has helped to encourage the spirit of inquiry in its users.

The method of gathering data on morbidity in the family practice teaching units at the University of Western Ontario has been described in the preceding paper by Newell et al.¹ This paper describes some of the uses of these data. It was quickly apparent when we began to define our practice population, that the questions, "Who are our patients?" and, "What problems do they have?" are really inseparable. The answer to one supplements the answer to the other. We considered that current morbidity data from our own practice populations would form a firm base for service, education, and research in family medicine. Now, after three years, the encounter data system serves all of these functions to some degree. We certainly have the means to compare our illness patterns with others but, in addition, the staff and residents have an accessible information system that

allows systematic inquiry into the work of the family physician.

Recording of Multiple Problems

Since family physicians frequently deal with more than one problem during an encounter with the patient, the information system was designed to accommodate this. Many studies in the literature of family practice tend to record only the main diagnosis for each patient contact. By examining our data and comparing "Main Diagnoses" with "All Diagnoses," some interesting differences appear.

Table 1 shows the absolute numbers and the rates per thousand patients at risk for patients consulting with conditions in the various ICD disease categories. The rank order demonstrates that, apart from Prophylactic Procedures, Diseases of the Respiratory System are the most common reasons for doctor-patient encounters. It should be noted that the data in this Table represent all problems dealt with by the physicians. Table 2 illustrates the different figures which are obtained when morbidity is recorded in terms of All vs Main diagnoses. The differences in the absolute numbers in the various categories reflect the many occasions on

which more than one problem was encountered. The low ratios seen in Table 2 for Pregnancy and Accidents result from the fact that these are seldom of secondary importance at any visit. The higher ratio in the Endocrine and Metabolism category reflects the number of occasions when Obesity is dealt with as a secondary problem. In the Diseases of Blood and Blood Forming Organs category the high ratio relates to Iron Deficiency Anemia and Other Incompletely Diagnosed Conditions appearing as secondary problems. Although the total figures for Congenital Malformations are too small to indicate a trend, the difference may be an artifact caused by the tendency of the recorder to label a highly conspicuous problem, whether it has been dealt with or not.

Comparison with Other Morbidity Data

We have been able to compare our overall morbidity patterns with the Second National Morbidity Survey,² which was carried out in the United Kingdom by the Royal College of General Practitioners. Comparisons are possible because our morbidity data have been related to the registered patient population. While the Second National Morbidity Survey allowed for the recording of more than one problem, this was not stressed. Thus, to make our data comparable, only main problems have been used. Table 3 shows that our consultation rates tend to be higher for most disease categories, but that the rank order of diagnostic groups is similar. The increased number of consultations in the Prophylactic Procedures group may reflect our heavier emphasis on preventive practices.

A simple comparison of consultation rates in the 18 major disease categories is, at best, crude, and seldom shows major differences between practices. We have found it most helpful to express our morbidity data in terms of rates per thousand patients at risk, in each of the biological age groups. Table 4 shows part of a detailed breakdown of the Diseases of the Respiratory System, which allows patterns of disease to be discerned.

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Table 1. Patients Consulting and Consultation Rates per 1,000 Population at Risk by Sex and Diagnostic Groups Utilizing All Recorded Diagnoses (1973)

ICD No.	Diagnostic Groups ICD and Supplement	Male	Female	Total	Rates / 1,000 at Risk			Rank
					Male	Female	Total	
001-136	Infective and parasitic diseases	519	648	1,167	92.2	98.1	95.4	11
140-239	Neoplasms	83	239	322	14.7	36.2	26.3	15
240-279	Endocrine, nutritional and metabolic diseases	307	634	941	54.5	96.0	76.9	14
280-289	Diseases of blood and blood-forming organs	53	128	181	9.4	19.4	14.8	16
290-315	Mental disorders	846	2,084	2,930	150.2	306.5	239.5	3
320-389	Diseases of the nervous system and sense organs	895	1,040	1,935	158.9	157.5	158.2	7
390-458	Diseases of the circulatory system	690	963	1,653	122.5	145.8	135.1	10
460-519	Diseases of the respiratory system	1,777	2,265	4,042	315.6	343.0	330.4	2
520-577	Diseases of the digestive system	425	627	1,052	75.5	94.9	86.0	12
580-629	Diseases of the genitourinary system	349	2,094	2,443	62.0	317.1	199.7	5
630-678	Complications of pregnancy, childbirth, and the puerperium	—	521	521	—	78.9	78.9	13
680-709	Diseases of the skin and subcutaneous tissue	955	1,365	2,320	169.6	206.7	189.6	6
710-738	Diseases of the musculoskeletal system and connective tissue	700	1,023	1,723	124.3	154.9	140.8	9
740-759	Congenital anomalies	16	17	33	2.8	2.6	2.7	18
760-779	Certain causes of perinatal morbidity and mortality	20	35	55	3.6	5.3	4.5	17
780-796	Symptoms and ill-defined conditions	952	1,717	2,669	169.1	260.0	218.1	4
N800-N999	Accidents, poisonings and violence	957	890	1,847	170.0	134.8	151.0	8
	Prophylactic procedures and other medical examinations	2,446	4,531	6,977	434.4	686.1	570.3	1
	Total	11,990	20,821	32,811	2,129.3	3,152.8	2,681.7	

For example, Chronic Bronchitis is seen to increase in prevalence with age, and is much more common in the male population in middle age and beyond. The Second National Morbidity Survey shows a similar trend, although the British rates are generally higher for respiratory illnesses. These data form a useful basis for undergraduate teaching concerning common clinical entities in primary care practice.

The Disease Index

On a day-to-day basis, the single most useful product of the information system is the "Disease Index." This is a computer printout which lists, under each diagnostic heading, the chart number, age, sex, and number of visits for each patient who has had that problem dealt with during the year. Visits are categorized as initial or subsequent visits for an episode. The Disease Index permits the rapid identification of patients with specific conditions, and allows an age-sex analysis to be made. It has been used in patient recall — for example, juvenile asthmatics for a newly introduced exercise program. It is useful in teaching, since a group of patients' charts can be quickly accessed for the preparation of relevant material on specific diseases. It provides a starting point for descriptive research into the natural history of disease, and has been used extensively, over the past two years, by residents in family practice. We have printed out Disease Indexes for the entire practice on an annual basis, and on special occasions have produced an index to certain subsets of the user population.

Utilization of Services by Families

Our encounter data have been used to identify the utilization patterns of families. According to Wilson (Wilson JL: Family utilization of a medical centre. Department of Family Medicine, University of Western Ontario. Paper in preparation.) patients who attend more frequently than expected tend to be members of families in which other members behave in the same way. Also, as family size

Table 2. Comparison of Recording of "Main" and "All" Diagnoses (1973)

ICD No.	Diagnostic Groups ICD and Supplement	Total Patients Consulting (All Diagnoses)	Total Patients Consulting (Main Diagnoses)	Ratio All / Main
001-136	Infective and parasitic diseases	1,167	971	1.2
140-239	Neoplasms	322	234	1.4
240-279	Endocrine, nutritional and metabolic diseases	941	570	1.7
280-289	Diseases of blood and blood forming organs	181	107	1.7
290-315	Mental disorders	2,930	2,012	1.5
320-389	Diseases of the nervous system and sense organs	1,935	1,515	1.3
390-458	Diseases of the circulatory system	1,653	1,132	1.5
460-519	Diseases of the respiratory system	4,042	3,463	1.2
520-577	Diseases of the digestive system	1,052	722	1.5
580-629	Diseases of the genitourinary system	2,443	1,846	1.3
630-678	Complications of pregnancy, childbirth, and the puerperium	521	479	1.1
680-709	Diseases of the skin and subcutaneous tissue	2,320	1,803	1.3
710-738	Diseases of the musculoskeletal system and connective tissue	1,723	1,332	1.3
740-759	Congenital anomalies	33	16	2.1
760-779	Certain causes of perinatal morbidity and mortality	53	42	1.3
780-796	Symptoms and ill-defined conditions	2,669	1,868	1.4
N800-N999	Accidents, poisonings and violence	1,847	1,663	1.1
	Prophylactic procedures and other medical examinations	6,977	5,608	1.2
	Total	32,811	25,383	1.3

Table 3. Patient Consulting Rates per 1,000 Registered Population – Comparison of University of Western Ontario Data with Second National Morbidity Survey

ICD No.	Diagnostic Groups ICD and Supplement	Western Ontario (Main)	Rank	Second National Morbidity Survey	Rank
001-136	Infective and parasitic diseases	79.4	11	70.7	10
140-239	Neoplasms	19.1	15	12.0	16
240-279	Endocrine, nutritional and metabolic diseases	46.6	14	26.0	13
280-289	Diseases of blood and blood forming organs	8.7	16	12.1	15
290-315	Mental disorders	164.4	3	109.9	6
320-389	Diseases of the nervous system and sense organs	123.8	8	113.1	5
390-458	Diseases of the circulatory system	92.5	10	66.2	11
460-519	Diseases of the respiratory system	283.0	2	260.7	1
520-577	Diseases of the digestive system	59.0	14	60.8	12
580-629	Diseases of the genitourinary system	150.9	5	74.8	9
630-678	Complications of pregnancy, childbirth, and the puerperium	72.5	12	22.4	14
680-709	Diseases of the skin and subcutaneous tissue	147.4	6	113.3	4
710-738	Diseases of the musculoskeletal system and connective tissue	108.9	9	91.3	7
740-759	Congenital anomalies	1.3	18	2.4	17
760-779	Certain causes of perinatal morbidity and mortality	3.4	17	0.4	18
780-796	Symptoms and ill-defined conditions	152.7	4	141.7	2
N800-N999	Accidents, poisonings and violence	135.9	7	82.5	8
	Prophylactic procedures and other medical examinations	458.4	1	138.9	3

increases, there is an increasing percentage of high user families. These families also tend to have a higher-than-expected number of problems of a social or emotional nature.

Experience of Residents

Recently we have adopted a form of feedback to residents based on the work of Tindall et al.³ They used encounter data in their teaching units to examine the clinical problems dealt with over a six-month period by residents in family medicine, and to compare their experience in specific categories of diseases with that of others in their peer group. Marked deviations from the mean are appropriate material for analysis, and possible indicators of a need for a change in exposure or orientation of that resident. Pilot results are encouraging. It is intended that this feedback be provided to our residents every three months, so that the information can be available while there is still time for appropriate change.

Common Conditions

A frequent question is, "What are the most common conditions in family practice?" Table 5 shows the rank order of the occurrence of common problems. The first column is a reflection of the prevalence of these problems in the community served, while the second relates to the physician's workload. Thus, the common cold brings more patients to the physician during the year than any other problem, but it is only the eighth most common condition with which the doctor deals in his office. In contrast, the physician or his nurse will frequently be attending to allergic patients, although only a small number of patients actually have specific allergies.

Table 4. Patients with One or More Episodes of the Specified Condition per 1,000 Patients at Risk

RCGP Code	Categories	0-4	5-9	15-24	25-44	45-64	65+	Total
240	Acute nasopharyngitis — non febrile							
	Male	738.8	184.9	116.2	93.8	108.1	115.0	182.9
	Female	714.0	220.5	183.7	176.5	129.1	109.9	209.4
241	Acute nasopharyngitis							
	Male	9.3	6.6	5.4	12.1	19.9	27.9	11.3
	Female	14.0	7.8	14.5	14.9	20.3	36.6	15.8
242	Acute pharyngitis and acute tonsillitis							
	Male	324.6	212.8	142.5	133.8	77.0	45.3	158.5
	Female	267.4	252.6	156.5	156.8	94.5	53.9	164.2
243	Acute sinusitis							
	Male	—	4.1	10.0	22.4	24.8	13.9	14.8
	Female	—	—	13.3	34.6	25.4	12.9	18.0
244	Acute laryngitis and acute tracheitis							
	Male	31.7	12.3	9.1	11.5	14.9	13.9	13.6
	Female	34.9	6.9	6.6	21.8	15.2	19.4	15.1
245	Epidemic influenza							
	Male	11.2	4.9	4.5	12.1	11.2	7.0	8.4
	Female	9.3	13.0	9.1	9.6	14.2	36.6	12.6
246	Pneumonia including pneumonia of newborn							
	Male	29.9	16.4	16.3	23.6	14.9	48.8	21.3
	Female	37.2	18.2	16.9	11.7	33.5	66.8	23.0
247	Acute bronchitis and bronchiolitis							
	Male	156.7	46.8	66.2	53.3	80.7	128.9	72.2
	Female	150.5	38.2	62.8	87.7	85.4	90.5	77.4
248	Chronic bronchitis							
	Male	—	0.8	2.7	5.4	21.1	55.7	8.2
	Female	—	—	3.6	6.4	6.1	19.4	5.0

Table 5. Rank Order of the Occurrence of Common Problems

Patients Visiting At Least Once	Frequency Rank	Visits
Preventive Examinations, etc	1	Preventive Examinations, etc
Coryza	2	Specific allergies
Anxiety state	3	Depression
Febrile sore throat	4	Hypertension
Depression	5	Family relationship problems
Lacerations, etc	6	Normal pregnancy
Family relationship problems	7	Anxiety state
Acute otitis media	8	Coryza
Hypertension	9	Febrile sore throat
Obesity	10	Acute otitis media
Abdominal pain	11	Obesity
Bronchitis	12	Lacerations, etc

Validity of Encounter Information

One of the problems in this or any other system is the error that can be introduced at a number of points in the collection process. Few published studies quantify this error, and therefore it is difficult to determine whether our information system is similar to others in this regard.

A study of a random sample of 108 charts was undertaken to determine the accuracy of the information. Comparison was made between the encounter data recorded and the information in the chart. A number of items were examined, and the following results obtained. There was no error in chart numbering. Sex and date of birth both showed errors of two percent. Fewer problems appeared on the encounter form than were recorded in the clinical note, exact matching occurring in 85 percent of cases. The coding of diagnoses, which is done by support personnel, was accurate in 84 percent of cases, but within the limits of broad disease categories, accuracy increased to 95 percent. Gruer noted that, even with experience in coding, an error of one to three percent could be expected.⁴

In a study coordinated by Bentsen,⁵ 59 resident-patient encounters were directly viewed by pairs of

experienced physician observers, who prepared lists of the problems dealt with during the observed encounters. These lists were compared to the encounter forms completed by the residents. The results showed that, on average, 2.54 problems were dealt with at each encounter, but only 1.51 were recorded. This represents a significant loss of data during the first step of information recording, and has great implication for workload studies and for morbidity recording. The secondary problems dealt with, but not recorded, may have been entered into the system at an earlier encounter or, if they persist, may be recorded at a later date.

Conclusion

The information system allows us to examine the morbidity patterns of registered teaching practices, which are generally representative of the city of London.⁶ Flexibility in the system permits the presentation of data in a variety of formats for service, educational, and research uses. We have utilized the data for internal comparison of the practice patterns of physicians at staff and resident levels. The data are useful as a resource in the preparation of teaching materials, both undergraduate and postgraduate. The

possibilities for inter-center comparisons are now being explored. Patients with high-risk conditions can be identified. Future developments in our computing techniques may allow direct recall of patients at predetermined intervals. The availability of a registered patient population, from which control groups can be prepared without difficulty, makes the information system an ideal base for clinical, operational and educational research. Perhaps one of the most significant aspects of the system is that it involves all residents and medical students who pass through the teaching practices. They can see at first hand the benefits of information which can be obtained by simple techniques of recording. It is hoped that they will be encouraged to institute similar inquiry in their own practices.

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