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#### 1. INTRODUCTION

Multiple sources of information have been compared to determine the accuracy of patient interview responses to questions on events in episodes of cancer of the colon or rectum. In section 4 we summarize the types of discrepancies found between the patient interviews and the other sources. This report is a part of an ongoing study of the patterns and care received by cancer patients in the health care system (1.). Information has been gathered concerning the dates of onset of symptoms, first contact with a doctor, sub sequent visits to medical providers, and surgery. Data have also been gathered on costs associated with the cancer episode.

## 2. SOURCES OF DATA

Interviews were conducted with a panel of persons residing in King County (including Seattle) who were diagnosed during 1975 as having cancer of the colon or rectum. The first interview occurred just after treatment. Followup interviews were held every three months up to one year's duration after treatment. The interviewers recorded the patient's responses to questions on the number of medical contacts and on the dates and doctors associated with each contact.

Some of the patients permitted us to see their medical bills and insurance reports relating to the illness. These bills and reports included dates of medical contacts (referred to hereafter as "contacts") and doctor's names. For other patients we received dates of contacts and doctors' names from the claim records of a large third-party insurer or from the medical records of a prepaid group practice. These sourc es served as an excellent source of comparison for the patients' recall of contacts as reported in the interviews. Another source of information, used mainly for checking demographic data supplied by the patients, was tumor registry records.

In all, data from these sources could be compared on a maximum of 72 patients. The number of patients and contacts included in calculations shown in the tables below varies according to the number of missing values for the variables involved.

#### METHODOLOGY

Information regarding contact dates and doctors were compared between medical bills and coded interviews for the period from first visit to a doctor up to discharge from the hospital after surgical treatment. We considered the medical bills to be the more reliable source, so that a difference between bills and interview report was counted as an error in the patient's recall of the event. It is also possible that coding and keypunching of the data may have introduced errors, but this appears to be minimal, as we shall point out later.

Each contact recorded on the medical bills was compared to contacts on the coded interviews. Any date or doctor differences between the two sources was noted. We also noted contacts which the patient failed to report, as well as extra, fictitious contacts reported by the patient. A reported contact could be considered fictitious only if the set of bills did not include the contact and the bills were known to be very complete for the period including the alleged contact.

A methodological problem in comparing the two contact records is that we could not link some contacts that perhaps should have been linked. An example will illustrate this. A patient reports seeing Dr. Early on February 4. A complete bill record shows that, by that date, the patient had not seen Dr. Early for a month, was now seeing Dr. Late, and there was no contact with Dr. Late on February 4. In reality, the patient may have been thinking of the events during a visit with Dr. Late on February 18, but gave the wrong name and was in error on the date by two weeks. Our coding system would label the February 4 contact as fictitious, and would code an unmatched bill contact on February 18 with Dr. Late as missed by the patient. From one point of view, this coding scheme acceptably represents the error. Alternative coding schemes, however, could be formulated.

In some cases, the bills covered only certain periods or certain doctors, so that comparisons could not be made between bills and interviews for some number of contacts. One of us evaluated the degree to which the bill record covered the period of interest for each patient (table 1.). 83% of the patients had bills with medium to good coverage.

#### TABLE 1

#### COVERAGE OF CONTACTS BY MEDICAL BILLS

Completeness of coverage	Number of patients	_%
Good	41	57%
Medium	19	26%
Poor	12	17%
	72	100%

#### 4. RESULTS

4.1 Accuracy in reporting numbers of contacts. Bills and interviews could be compared for 72 patients who reported 478 contacts in the aggregate. Among the 478 contacts, 415 (87%) could be compared between bills and interview to find discrepancies. The remaining 63 contacts were reported by the patients for periods not covered by our bill records.

Table 2 summarizes the types of between-source discrepancies found by comparing bills and interviews for the 343 contacts with doctors. (Hospital admissions are not included in table 2).

The most serious error reflected in Table 2 is the proportion of contacts not reported by the patients. Among the 310 contacts which were listed on the bills and thus appear to be <u>bona</u> fide, 98 (32%) were not reported by the patients.

Almost half (45/98) of contacts not reported by the patients were referrals by a doctor for a single contact with an outside specialist (Table 3). Most often this specialist was a radiologist.

#### TABLE 2 RESULTS OF COMPARING BILLS AND INTERVIEWS FOR 343 CONTACTS WITH DOCTORS % # 74 22 Patient and bills agree on date Patient and bills disagree on date 121 35 Fact of contact verified by bills, patient did not know date 17 5 Patient did not report contact 98 29 Sub-total, contacts listed on bills (310)Fictitious contact reported by patient (inconsistent with bills). 33 10 343 101 Total

Such contacts may be forgotten due to the brevity of the doctor-patient involvement and the fact that the patient usually hears the results of the visit at a subsequent visit with his own doctor.

#### TABLE 3

CONTACTS NOT REPORTED	BY PATI	ENTS
	#	%
Single contact referrals	45	46
to radiologist 24		
to internist 12		
to GP or family		
Practitioner 4		
other 4		
45	_	
Other contacts	_53_	_54_
Total	98	100%

Another possible reason for some of the large number of missed contacts may be the difficulty of matching some of the bill and interview contacts. As mentioned above, some contacts may have been reported by the patient with a wild date and incorrect doctor, leading us to code a single error as two errors: one missed contact (an unmatched contact on the bills) and one fictitious contact (an unmatched contact on the interview which is inconsistent with the bills). Therefore, if the 98 unreported contacts are reduced by 33 - the number of fictitious contacts the remaining 65 "unreported" contacts are 21% rather than 32% - of the 310 contacts listed on the bills.

For each patient we calculated the difference between the number of ficitiious contacts and the number of unreported contacts. A difference of zero indicates that the patient has recalled the correct total number of contacts. We classified the patients into those who did and those who did not report the correct number of contacts. The relationship between various factors and percent of patients reporting the correct number of contacts is shown in table 4. The correct number of contacts was reported more frequently in longer interviews, for patients whose responses the interviewers felt were more reliable, in cases where there were fewer contacts to report, and in interviews taking place outside of the hospital. (The interviewers had previously commented that the patients were more receptive and alert outside of

the hospital, when they had recovered from medication and the trauma of the surgery.) Patients age, sex, education, and occupation did not affect the accuracy of reporting number of contacts. Table 4 also shows no difference between interviewers in per cent of patients reporting the correct number of contacts.

TABLE	4
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#### EFFECT OF SELECTED FACTORS ON PERCENT OF PATIENTS REPORTING CORRECT NUMBER OF CONTACTS

Factor	Category	<u>N/N</u>	<u>%</u>	
Interview time	$\leq$ 1 hr.	13/37	= 35%	
	> 1 hr	9/17	= 53%	
Interviewer	A	9/23	= 39%	
	В	13/33	= 39%	
Interviewer's	Good	15/30	= 50%	
assessment of reliability	Poor	2/7	= 26% = 29%	
Total # contacts	1-4 5-8	6/9 12/31	= 67% = 39%	
	9+	4/16	= 31%	
Place of interview	Hospital Home other	4/13 18/43	= 31%	
Total	nome, other	22/56	= 39%	
<pre>* 100 x (patients with correct number) ÷ (all patients in category)</pre>				

4.2 Accuracy in reporting dates of contacts. Another statistic used to measure the reliability of the interview data is the difference, in days, between the patient-reported date and the bill date for a particular contact. Table 5 shows that, while the date differences range widely, 86% of the differences are within one week. Among the contacts with non-zero differences, 77% have differences within one week. Note, also, that the differences are quite evenly divided about zero (the median difference is zero.)

TABLE 5 DISTRIBUTION OF TIME DIFFERENCES BETWEEN BILL RECORD AND PATIENT REPORT OF CONTACTS\* DIFFERENCE IN DAYS (Bills NUMBER OF Minus Patient Report) CONTACTS % -22 or more negative 5 3 15 to -21

-15 to -21	3	2
-8 to -14	7	4
-1 to -7	44	23)
0	74	38 86%
1 to 7	48	25)
8 to 14	8	4
15 to 21	2	1
≥ <sup>22</sup>	2	1
Total	193	101%
Maximum = 34		
Minimum00		

Minimum =-90

Median = 0

\*Includes Hospital Admissions

Recall of dates for early events in the cancer episode was generally less accurate than for later events (Table 6). The standard deviation of date difference decreased from the earliest verifiable event, the first contact with a doctor, to later events. This is also reflected in the increase in the percent of differences of one week or less. It is worth noting, however, that a number of patients (12/72) could not recall their hospital discharge date. The dates reported by the patients for the events in Table 6 were dispersed evenly about the bill date. The median differences are all trivially different from zero.

#### TABLE 6

DIFFERENCES BETWEEN PATIENT REPORT				
	AND BILL RECORD FOR SOME KEY			
	CONTACTS	IN THE	CANCE	R EPISODE
		q	ر د م	
		ć	liffer-	-
			ences	
	Median	Std.	one	No. of
	<u>difference</u>	Dev.	week	differences
First vis:	ít			
to doctor	2 days	21.6	76	55
Referral :	to			
surgeon	.1	8.9	88	48
Hospital				
admission	.0	3.9	99	71
Surgary	0	2 1	96	70
Surgery	.0	2.1	90	70
Hospital				
discharge	.0	1.9	100	59
	••	_ • • <i>&gt;</i>		

# 4.3 Accuracy in identifying doctors.

We checked to see how accurately we could identify certain doctors from information supplied by the patient. The patients could sometimes supply only the doctor's last name or were uncertain of the spelling of the name. The coder would have to attempt to more fully identify the doctor from various physician directories. We compared the result of this process with the doctor's name given on the bills. For 19% (11/17) of the patients, the first doctor seen was not identified correctly. The error in identifying the surgeon - the doctor whom we usually contacted for permission to call the patient and whose name we knew accurately - was only 3% (2/67), and probably indicates the level of error in coding and keypunching.

4.4 Accuracy in reporting demographic data

We were able to check three demographic variables by comparing hospital records and the interview responses for marital status, race, and age. (Interviewer's estimate of race was used for coding race in the interview). For marital status and race, the differences were minor (Table 7). There were a large proportion (51%) of age differences between the two sources. However, only one difference was as much as two years and all of the remaining differences were one year. Age differences occurred more commonly among the elderly.

#### TABLE 7

#### AGREEMENT BETWEEN PATIENT/INTERVIEWER REPORT AND HOSPITAL RECORD FOR THREE DEMOGRAPHIC VARIABLES

VARIABLE	CATEGORIES USED IN COMPARING	% AGREEMENT
Marital Status	Married, single	57/58 = 98%
Race	White, Non-white	55/56 = 98%
Age*	Single years	29/59 = 49%
Age < 65 Age <u>&gt;</u> 65	Single years Single years	19/32 = 59% 10/29 = 34%

#### 4.5 Effect of probing vs. brief interview

The effect of style of interviewing on response could be compared for several items (Table 8). In one interview situation a number of topics were covered briefly, including cost of care. In the second situation, one of the authors interviewed the patients in depth about cost and factors related to it. In this second interview the patients usually provided bills which allowed an accurate assessment of cost items, but if bills were not available, the interviewer asked a number of probing questions about cost. The differences in responses between the interviews were, more often than not, due to the probing interview finding a less desirable situation than the brief interview. That is, the probing interview found more hospital admissions, more impact on family finances, and larger amounts for the hospital bill and out-of-pocket costs.

In many of the cases where there was agreement between the two interviews on two of the cost items (amount of hospital bill and surgeon's fee), the patients were referring to the same bill for their responses in both interviews. The low percentage of agreement (21%) between interviews on the out-of-pocket cost is probably due to the lack of a single bill which covered this cost and which the patient could refer to. In fact, of the 75 patients who were asked about out-of-pocket costs on both interviews, 22 (29%) would not hazard even a guess in response to this question. This under-reporting of cost is also reflected in the small denominators for the cost and finance items in table 8. Potentially, there were 75 respondents, and the attrition is due to "don't know" responses on the brief interview or to our being unable to obtain the probing interview.

# TABLE 8

# COMPARISON OF RESPONSES TO A BRIEF INTERVIEW AND TO A PROBING INTERVIEW

ITEM	COMPARISON OF RESPONSES	<u>#</u>	<u>%</u>
Number of hospital	Probing more admissions than brief	11	15
	Same	60	85
	Brief more admissions than probing	_0	-
		71	100%
Impact of cancer	Probing more impact than brief	6	14
episode on family finances	Same	35	81
	Brief more impact than probing	2	5
		43	100%
Amount of hospital	Probing > brief	14	35
DIII	Probing = brief	19	48
	Brief < probing	7	18
		40	101%
Amount of surgeons fee	Probing > brief	5	16
	Probing = brief	22	. 69
	Probing < brief	5	16
		32	101%
Pationt's out-of	Drobing > brief	11	1.6
pocket cost for	HODING > DITEL	11	40
cancer episode	Probing = brief	5	21
	Probing < brief	8	<u>33</u>
		• 24	100%

# 5. SUMMARY

Patient interviews and other sources of data have been compared to determine the reliability of the interview data. Patients tended to forget some of their contacts with their doctors and, to a lesset extent, to report fictitious contacts. Single-contact referrals to a specialist accounted for half of non-reported contacts. When patients did report events, they reported the dates of occurrence fairly accurately. Demographic characteristics of the patients did not affect the accuracy of the reports, while some of the interviewing-related characteristics did. Accuracy of reporting decreased as time between event and interview increased. Age, race, and marital status were reported with acceptable accuracy. A probing interview technique uncovered higher costs and impact of the cancer episode than a brief interview did. Under-reporting was a problem in obtaining cost data.

### REFERENCES

 Anita Francis, Lincoln Polissar, "The Social Epidemiology of Cancer Care: Patterns of Health Care for Colo-rectal Cancer." (In preparation)