Potential for inpatient-outpatient substitution with diagnosis-related groups

by Noralou P. Roos and Jean L. Freeman

Through analysis of data from the universal health insurance system in Manitoba, Canada, surgical diagnosis-related groups (DRG's) with the greatest potential for inpatient-outpatient substitution are identified. Candidates for both "inpatient shift" and "outpatient shift" are discussed. It is also suggested that determination of the procedure chiefly responsible for hospital admission complements approaches to improve the DRG classification system by measuring severity of illness. Thus, health care planners' efforts may be facilitated in establishing effective payment systems, though definitive guidelines are not provided.

Introduction

The substitution of ambulatory care for inpatient hospital care has long been advocated as a safe and efficacious method of cost containment. Procedures performed in ambulatory surgical units generally require fewer resources, in terms of professionals and facilities, than the same surgery performed on an inpatient basis. Proponents of ambulatory surgery argue that quality is not compromised and patients are not exposed to the potential iatrogenic hazards of hospitalization.

Reimbursement and payment policies have had a considerable influence on the shift in surgery across alternative sites of care. Private insurers who cover both inpatient and outpatient services can and do encourage the use of ambulatory surgery by offering special incentives to make it more attractive relative to inpatient surgery (Pauly and Burns, 1984). In addition, some companies have developed lists of operations that are reimbursed only on an outpatient basis unless the patient has complications (Nathanson, 1986).

Under prospective payment systems based on diagnosis-related groups (DRG's), hospitals are encouraged to operate more efficiently and are paid a fixed rate per case for inpatient services. Hospitals may keep any excess of payments over costs, but must also absorb the loss if costs exceed payments. Because outpatient services, including ambulatory surgery, are covered by a different method of reimbursement, financial considerations play an important role in the decision of where to treat patients. What is financially beneficial or disadvantageous to the hospital depends on the real resource cost of treating the patient in a given setting and the amount of the payment for services provided in that setting. In the Medicare program, inpatient payment levels are reflected in the DRG weight; the higher the weight assigned a DRG, the higher the payment for patients in that category.

On the one hand, when the payment rate for a surgical DRG is perceived to be too low to cover the costs of inpatient services, there is the incentive to do the procedure in an outpatient department. For example, under the Medicare program, outpatient payments are still based on incurred cost (Carter and Ginsberg, 1985). In the case of lens extraction, the amount Medicare has paid some hospitals for performing the surgery on an outpatient basis sometimes exceeds the inpatient DRG rate. Such procedures are prime candidates for "outpatient shift" under the prospective payment system (PPS).

There is also the concern that patients who could be treated on an outpatient basis would be admitted as inpatients to generate short stays that might be more profitable under PPS—the so-called "inpatient shift" incentive. This incentive may be strong for surgical DRG's, in which procedures that can be performed in an ambulatory setting are often grouped with other procedures that require more followup care and are generally considered more appropriate for the inpatient setting.

Finally, choice of surgical setting, when based on financial incentives, rather than on patient morbidity considerations, might lead to adverse effects on quality of care (Hammons, Brook, and Newhouse, 1986). This is a major concern of the Prospective Payment Assessment Commission (ProPAC), in light of substantial increases in outpatient utilization by Medicare beneficiaries since the introduction of PPS in 1983 (Prospective Payment Assessment Commission, 1986). The commission has recommended extending the responsibilities of the professional review organizations (PRO's) to include a review of outpatient surgery for selected procedures.

Little information is available on which DRG's are particularly affected by these shifts. RAND researchers used internal documents from the Health Care Financing Administration (HCFA) and a physician consultant to prepare a list of DRG's that

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have a high potential for outpatient substitution (Carter and Ginsberg, 1985). No empirical data have previously been available for comparing this list with actual utilization by site of service. An empirical assessment is particularly difficult in the United States, because large health services data bases, covering residents of States or other well-defined populations (such as Medicare beneficiaries), do not combine inpatient and outpatient utilization data. Information on individual persons must be merged across files that often have different formats and are maintained by different organizations. Comparing utilization across settings for the Medicare population may be particularly difficult in the future, because HCFA requires hospitals to use different coding systems to bill for inpatient *(International Classification of Diseases, 9th Revision, Clinical Modification* [ICD-9-CM]) and outpatient (Current Procedural Terminology [CPT]) surgery (Shahoda, 1987).

In the universal health insurance system operating in Manitoba, Canada (population 1 million), hospitals are funded on the basis of global budgets. Hospital discharge abstracts are produced for all patients admitted to a hospital, whether for an inpatient stay or for an outpatient procedure. All diagnoses and procedures are coded using the ICD-9-CM system.

Despite the differences in payment systems, there are many similarities between hospitalization patterns in Manitoba and in the United States (Roos, 1984; Roos and Ramsey, 1987; Roos and Danzinger, 1986; Roos and Lyttle, 1985). Manitoba and U.S. hospital discharge rates are very similar for individuals 65 years of age or over (398 discharges per 1,000 population in the United States and 403 per 1,000 in Manitoba) (Lohr, Lohr, and Brook, 1985). Manitoba discharge rates for the population overall are lower than those for the United States (141 per 1,000 versus 168), although they are similar to discharge rates of hospitals in the western United States (144 per 1,000) (Lohr, Lohr, and Brook, 1985).

Manitoba urban hospitals also represent reasonably progressive standards in terms of outpatient surgery. Although comparable data for U.S. hospitals as a whole are lacking, Manitoba hospitals can be compared with those of Syracuse, New York, a city having aggressive standards for performing ambulatory surgery (Lagoe and Milliren, 1986). Manitoba urban hospitals perform more procedures on an outpatient basis than a Syracuse hospital with an on-site program, although somewhat fewer than a Syracuse hospital with a freestanding ambulatory surgery unit (Roos, 1988).

The site of outpatient surgery does vary somewhat, however, across countries. With the exception of a few minor plastic surgical procedures, all outpatient surgery in Manitoba is carried out in conjunction with a hospital. There are essentially no freestanding surgery centers. In the United States, there were 592 freestanding outpatient surgery centers open in 1986, and they performed 14 percent of all outpatient procedures (Henderson, 1987).

From one perspective, Manitoba is an ideal site for this research. Because a DRG-based payment system has never been used in Manitoba, hospital admission policies and coding practices could not have been influenced by these payment concerns.

In this article, we identify those DRG categories that appear to have the most potential for inpatient-outpatient substitution. We then compare the Manitoba results with the DRG categories identified by researchers as having a potential for outpatient shift, using a nonempirical approach. Finally, we focus on DRG's with a high potential for inpatient shift. Of interest is whether the homogeneity of these groups could be improved with further subdivisions, using short-stay procedures. This latter analysis is meant to identify a new approach for refining the DRG system, not to provide definitive guidelines.

Methods

All 1982-84 acute inpatient and outpatient hospitalizations of Manitobans 20 years of age or over were available to the project. (Medical and pediatric DRG categories were excluded from the analysis, as were admissions classified under the miscellaneous DRG category 470.) Because the DRG system in the United States has been applied largely to the Medicare population, all analyses presented here focus on the Manitoba population 65 years of age or over. Analyses based on the entire adult population are available from the senior author.

Discharges from Manitoba's 8 largest hospitals, each with 125 beds or more and occupancy rates of 70 percent or higher, were analyzed. All eight hospitals performed ambulatory surgery as part of a hospital-integrated program. After excluding hospitalizations resulting in deaths, there were 35,630 eligible discharges from these 8 hospitals during the 3-year period 1982-84, with 18.0 percent of the patients undergoing treatment on an outpatient basis. Patients treated in hospital walk-in clinics, the emergency room, or ambulatory care facilities were excluded, unless a previously scheduled procedure had taken place (such as biopsy and laparoscopy).

Both inpatient and outpatient admissions were classified by ICD-9-CM codes into surgical DRG's, using standard second-revision DRG assignment software available from Health Systems International (1986). These definitions are consistent with those reported in the September 3, 1985 issue of the *Federal Register*. Although the DRG system requires a principal diagnosis ("the condition established after study to be chiefly responsible for occasioning admission of the patient to the hospital for care"), the Manitoba system recorded the primary diagnosis (that diagnosis which "describes the most significant condition for which the patient was hospitalized"), as well as up to seven additional diagnoses.

The extent to which any discrepancy between these two definitions affects the study's generalizability to the United States is not known. However, internal studies at the U.S. Veterans Administration, cited by

Table 1

Number of cases, by place of service and major diagnostic category: Manitoba, Canada, 1982-84

Name and number of major diagnostic category	Number of cases	Place of service		
		Outpatient	Inpatient	
			1-3 days	4 or more days
		Percent of stays		
Diseases and disorders of the nervous system (1)	905	20.6	14.0	65.4
Diseases and disorders of the eye (2)	6,006	16.8	26.6	56.6
Diseases and disorders of the ear, nose, and throat (3)	510	13.7	49.0	37.3
Diseases and disorders of the respiratory system (4)	705	4.5	3.6	91.9
Diseases and disorders of the circulatory system (5)	2,354	1.6	8.2	90.1
Diseases and disorders of the digestive system (6)	6,147	22.3	4.7	73.0
Diseases and disorders of the hepatobiliary system and pancreas (7)	1,569	1.4	1.0	97.6
Diseases and disorders of the musculoskeletal system and connective tissue (8)	4,674	8.3	6.1	85.6
Diseases and disorders of the skin, subcutaneous tissue, and breast (9)	3,334	66.1	6.5	27.4
Endocrine, nutritional, and metabolic diseases and disorders (10)	189	10.6	4.2	85.2
Diseases and disorders of the kidney and urinary tract (11)	1,949	16.7	13.4	69.9
Diseases and disorders of the male reproductive system (12)	3,628	2.4	3.8	93.8
Diseases and disorders of the female reproductive system (13)	1,847	11.8	16.2	72.0
Diseases and disorders of the blood and blood-forming organs and immunological disorders (16)	165	34.6	4.9	60.6
Myeloproliferative diseases and disorders and poorly differentiated neoplasms (17)	696	24.9	22.7	52.4
Infections and parasitic diseases (systematic or unspecified sites) (18)	32	3.1	3.1	93.8
Mental diseases and disorders (19)	72	0.0	1.4	98.6
Injuries, poisonings, and toxic effects of drugs (21)	370	14.9	15.4	69.7
Burns (22)	13	0.0	0.0	100.0
Factors influencing health status and other contacts with health services (23)	465	36.6	23.4	40.0
Overall	35,630	18.0	11.3	70.6

SOURCE: Government of Manitoba: Data from the Manitoba Health Services Commission.

Lloyd and Rissing (1985), noted only minute differences between primary and principal diagnoses. In a separate study of 1,100 medical records of Australian inpatients, Roberts, Reid, and Irwin (1985) found differences between the 2 diagnoses in 68 records (6.4 percent). Forty-three of the differences in the 584 records with multiple diagnoses resulted in changes in DRG assignment.

The approach taken is basically descriptive. First, hospital admissions are classified by DRG and by length of stay; that is, according to whether a patient was treated on an outpatient basis (0-day stays), was admitted for a 1-3-day stay, or was admitted for a 4-day stay or longer. Patients discharged from the hospital after a 1-3-day stay were separately classified, because such patients might conceivably be treated on an outpatient basis.

Second, DRG's with a large proportion (35 percent or more) of patients treated on an outpatient basis were identified as having a high potential for inpatient-outpatient substitution. These were divided into two groups: those with weights less than 1 and those with weights greater than or equal to 1. DRG's in these two groups were considered candidates for outpatient and inpatient shift, respectively.

A weight of 1 was chosen as a bound for reviewing groups for inpatient or outpatient shift, because DRG's with weights greater than 1 have mean costs per case (and hence payment rates) that are higher than the average across all DRG's for the Medicare population. It is to some extent an arbitrary criterion for screening the DRG's. As one reviewer indicated, the point at which incentives exist to shift depends on an individual hospital's costs for performing surgery in one site versus the other and the corresponding payment levels.

Third, patients in DRG's with a high potential for inpatient shift were classified by the procedure responsible for the patient's DRG assignment to determine if there are patterns that suggest methods of improving the system. If certain procedures in these high-weight DRG's are performed almost exclusively on an outpatient basis or during a 1-3-day stay, this would suggest that hospitals should be paid differently for such patients than for patients undergoing procedures almost always associated with a longer stay.

Finally, the results of our empirical assessment of the potential of individual DRG's for inpatient-outpatient substitution are compared with the results obtained by RAND researchers Carter and Ginsberg (1985).

Results

In Table 1, the proportion of cases in each major diagnostic category (MDC) are shown, according to the type of hospital admission (outpatient, 1-3-day stay, or longer stay). The proportion of patients treated on an outpatient basis ranged from 66.1 percent to 0; patients with diseases and disorders of the skin, subcutaneous tissue, and breast were most

Table 2

Number and percent of outpatient admissions and diagnosis-related group (DRG) weights for surgical DRG groups with 35 percent or more cases treated on an outpatient basis: Manitoba, Canada, 1982-84

Surgical DRG	Admissions: Total	Admissions: Outpatient as a percent of total	DRG weights	One of RAND'S 34 procedures
270 Other skin, subcutaneous tissue, and breast OR procedures, patient age under 70 years, without complications or comorbidities (9)	611	95	0.762	X
269 Other skin, subcutaneous tissue, and breast OR procedures, patient age 70 years or over, and/or with complications or comorbidities (9)	1,275	91	1.133	
228 Ganglion (hand) procedures (8)	49	88	0.366	X
40 Extraocular procedures except orbit, patient age 18 years or over (2)	745	77	0.413	X
260 Subtotal mastectomy for malignancy, patient age under 70 years, without complications or comorbidities (9)	46	74	0.666	
155 Stomach, esophageal, and duodenal procedures, patient age 18-69 years, without complications or comorbidities (6)	348	74	1.791	
153 Minor small and large bowel procedures, patient age under 70 years, without complications or comorbidities (6)	57	74	1.099	
232 Arthroscopy (8)	25	68	0.671	X
262 Breast biopsy and local excision for nonmalignancy (9)	276	65	0.425	X
61 Myringotomy with tube insertion, patient age 18 years or over (3)	47	64	0.427	X
6 Carpal tunnel release (1)	247	60	0.407	X
402 Lymphoma or leukemia with other OR procedures, patient age under 70 years, without complications or comorbidities (17)	56	59	1.056	
259 Subtotal mastectomy for malignancy, patient age 70 years or over, and/or complications or comorbidities (9)	126	58	0.861	
293 Other endocrine, nutritional, and metabolic OR procedures, patient age under 70 years, without complications or comorbidities (10)	11	55	1.796	
313 Urethral procedures, patient age 18-69 years, without complications or comorbidities (11)	24	54	0.594	
38 Primary iris procedures (2)	163	54	0.399	
158 Anal and stomal procedures, patient age under 70 years, without complications or comorbidities (6)	282	54	0.551	
169 Procedures on the mouth, patient age under 70 years, without complications or comorbidities (6)	78	53	0.659	
266 Skin grafts and/or debridement, except for skin ulcer or cellulitis, without complications or comorbidities (9)	218	51	0.731	X
157 Anal and stomal procedures, patient age 70 years or over, and/or complications or comorbidities (6)	481	48	0.730	
268 Skin, subcutaneous tissue, and breast plastic procedures (9)	86	47	0.569	X
154 Stomach, esophageal, and duodenal procedures, patient age 70 years or over, and/or complications or comorbidities (6)	1,158	45	2.688	
227 Soft tissue procedures, patient age under 70 years, without complications or comorbidities (8)	43	44	0.687	
231 Local excision and removal of internal fixation devices except hip and femur (8)	105	42	0.752	
345 Other male reproductive system OR procedures, except for malignancy (12)	60	40	0.820	
8 Peripheral and cranial nerve and other nervous system procedures, patient age under 70 years, without complications or comorbidities (1)	40	40	0.747	
394 Other OR procedures of the blood and blood-forming organs (16)	61	39	1.089	
364 Dilation and curettage, except for malignancy (13)	355	39	0.392	
342 Circumcision, patient age 18 years or over (12)	49	39	0.427	X
360 Vagina, cervix, and vulva procedures (13)	124	38	0.606	
461 OR procedures with diagnoses of other contacts with health services (23)	465	37	1.357	
311 Transurethral procedures, patient age under 70 years, without complications or comorbidities (11)	181	36	0.556	X
152 Minor small and large bowel procedures, patient age 70 years or over, and/or complications or comorbidities (6)	160	36	1.407	
401 Lymphoma or leukemia with other OR procedure, patient age 70 years or over, and/or complications or comorbidities (17)	189	35	1.590	
344 Other male reproductive system OR procedures for malignancy (12)	78	35	1.122	

NOTES: Numbers in parentheses are major diagnostic category codes. OR is operating room. DRG weights are from the *Federal Register*, Part III Medicare Program; Changes to the Inpatient Hospital Prospective Payment System and Fiscal Year 1986 Rates; Final Rule, September 3, 1985.

SOURCE: Government of Manitoba: Data from the Manitoba Health Services Commission.

likely to be treated on an outpatient basis and patients with burns or mental diseases least likely.

In Table 2, the 35 surgical DRG's for which 35 percent or more of the cases in Manitoba hospitals were treated on an outpatient basis in 1982-84 are identified. These procedures have been listed according to the percent treated on an outpatient basis and the associated DRG weight (the higher the weight,

Table 3

Percent of DRG stays for patients in higher-weight surgical DRG's, by length of stay: Manitoba, Canada, 1982-84

DRG	Length of stay in days		
	0	1-3	4 or more
	Percent of DRG stays		
152 Minor small and large bowel procedures, patient age 70 years or over, and/or complications or comorbidities (6)	35.6	0.0	64.4
153 Minor small and large bowel procedures, patient age under 70 years, without complications or comorbidities (6)	73.7	1.8	24.6
154 Stomach, esophageal, and duodenal procedures, patient age 70 years or over, and/or complications or comorbidities (6)	45.3	1.0	53.8
155 Stomach, esophageal, and duodenal procedures, patient age 18-69 years, without complications or comorbidities (6)	73.9	0.9	25.3
269 Other skin, subcutaneous tissue, and breast OR procedures, patient age 70 years or over, and/or with complications or comorbidities (9)	91.0	2.4	6.7
394 Other OR procedures of the blood and blood-forming organs (16)	39.3	9.8	50.8
401 Lymphoma or leukemia with minor OR procedure, patient age 70 years or over, and/or complications or comorbidities (17)	35.5	9.5	55.0
402 Lymphoma or leukemia with other OR procedures, patient age under 70 years, without complications or comorbidities (17)	58.9	7.1	33.9
461 OR procedures with diagnoses of other contacts with health services (23)	36.6	23.4	40.0

NOTES: Numbers in parentheses are major diagnostic category groups. DRG is diagnosis-related group. OR is operating room. Totals may not add to 100.0 because of rounding.

SOURCE: Government of Manitoba: Data from the Manitoba Health Services Commission.

Table 4

Number of cases and percent distribution of short-stay surgery admissions, by length of stay and major operative procedure for patients in high-weight DRG categories: Manitoba, Canada, 1982-84

DRG number	ICD-9 CM[1] code	Major operative procedures	Number of cases (N)	Length of stay in days		
				0	1-3	4 or more
				Percent distribution		
152	45.15	Other biopsy of small intestine	85	56.4	0	43.6
		Other procedures in this DRG	75	16.0	0	84.0
153	45.15	Other biopsy of small intestine	43	93.0	2.3	4.7
		Other procedures in this DRG	14	14.3	0	85.7
154	44.15	Other biopsy of stomach	749	68.8	1.2	30.0
		Other procedures in this DRG	409	2.2	.5	97.3
155	44.15	Other biopsy of stomach	283	88.3	.4	11.3
		Other procedures in this DRG	65	10.8	3.1	86.2
269	8.20	Removal of lesion of eyelid not otherwise specified	36	100.0	0	0
	27.43	Other excision of lesion or tissue of lip	45	91.1	2.2	6.7
	86.3	Other local excision or destruction of lesion or tissue of skin and subcutaneous tissue	1,079	95.7	1.6	2.7
		Other procedures in this DRG	115	43.5	10.4	46.1
394	40.11	Biopsy of lymphatic structure	28	46.4	14.3	39.3
		Other procedures in this DRG	33	33.3	6.1	60.6
401	40.11	Biopsy of lymphatic structure	72	36.5	7.8	55.8
		Other procedures in this DRG	117	31.6	9.4	59.0
402	40.11[2]	Biopsy of lymphatic structure	20	65.0	10.0	25.0
		Other procedures in this DRG	36	55.6	5.6	38.9
461	44.15	Other biopsy of stomach	27	70.4	11.1	18.5
	57.33	Transurethral biopsy of bladder	66	40.9	34.9	24.2
	57.49	Other transurethral excision or destruction of lesion or tissue of bladder	161	37.3	40.4	22.4
		Other procedures in this DRG	211	30.3	8.5	61.1

[1]ICD-9-CM is *International Classification of Diseases, 9th Revision, Clinical Modification.*

[2]This code has been included in DRG 402 despite its not meeting the criterion for total N, because it is the only one under that group meeting the other criterion.

NOTE: DRG is diagnosis-related group.

SOURCE: Government of Manitoba: Data from the Manitoba Health Services Commission.

the more the hospital is paid for an inpatient case). In addition, procedures are flagged if the RAND group identified this as a DRG with potential for outpatient substitution. As expected, DRG's on this list, which included patients with complications or patients 70 years of age or over (DRG's 269, 259, 154, 152, 157, 401) have fewer patients admitted as outpatients than do the less-complex companion DRG's (270, 260, 155, 153, 158, 402).

Outpatient shift

DRG's with a large proportion of outpatient admissions generally have low weights (less than 1). Thus, 8 of the 11 DRG categories with 60 percent or more cases treated on an outpatient basis (the top 11 surgical DRG's listed in Table 2) had weights of .762 or less (including 5 with weights of .427 or less), reflecting relatively low payment rates under PPS. Hospitals might feel some pressure to treat cases in these DRG categories in the outpatient setting (thus causing outpatient shift), particularly if fewer resources are required to treat patients and if payment is on an incurred-cost basis.

However, not all DRG's with a large proportion of cases treated on an outpatient basis have low weights and low payment rates. Thus, DRG 155 (stomach, esophageal, and duodenal procedures) has a weight of 1.791, and DRG 269 (other skin, subcutaneous tissue, and breast operating room procedures) has a weight of 1.133, even though 74 percent and 91 percent, respectively, of these cases were treated on an outpatient basis in Manitoba (Table 2). Overall, a wide variety of DRG's have a significant potential for inpatient-outpatient substitution; a major incentive for inpatient shift or outpatient shift is the assigned weight. Although not shown in Table 2, an additional 15 DRG's had 20-34 percent of their cases treated on an outpatient basis.

Inpatient shift

In an attempt to identify cases with potential for inpatient shift, selected DRG's from Table 2 are presented in Table 3. These 9 DRG's had weights of 1.0 or greater and had at least 50 cases treated in Manitoba urban hospitals in 1982-84. The patients in each DRG are classified according to whether they received treatment on an outpatient basis, during a 1-3-day stay, or during a longer inpatient admission. A large group of patients classified in each of the DRG's presented in Table 3 was treated on an outpatient basis or during a short inpatient stay of 1 to 3 days. Perhaps most impressively, fewer than two-thirds (53.8 percent) of the patients classified in the very-high-weight, high-payment DRG 154 were admitted for stays of 4 days or longer. This DRG is for stomach, esophageal, and duodenal procedures for patient 70 years of age or over or patients with substantive comorbidities or complications. A large proportion of such patients had their procedures performed on an outpatient basis (45.3 percent).

Patients within each DRG in Table 3 were further subdivided, in an attempt to determine if particular procedures in each group lent themselves to treatment on an outpatient or short-stay basis. We also sought to determine if certain procedures were routinely associated with longer stays, potentially more appropriate to a high-weight DRG. Thus, in Table 4, patients in each of the nine high-weight DRG groups are classified according to the specific procedure performed and type of stay. Major surgical procedures are listed if 25 or more patients had this procedure and 30 percent or more of the patients were treated on an outpatient or short-stay basis. As can be seen in Table 4, a small group of primary procedures in several of these DRG groups accounted for the large majority of outpatient and short-stay cases. Depending on how the payment system is designed, these procedures may be prime candidates for inpatient shift.

For some of these procedures, the code could represent either major or minor surgery. As an example, consider 45.15–small bowel biopsy, not elsewhere classified. The code does not distinguish between open and closed biopsies. Open biopsies belong in the surgical DRG, and the closed biopsies belong in a nonsurgical or medical group. As a way of addressing this and other biopsy-related coding limitations, Medicare requires that a specific non-operating-room code be substituted for an operating room code when the biopsy is closed—e.g., 45.15 for open biopsies; 45.14 for closed biopsies (Health Systems International, 1986). This rule was not in effect in Manitoba, so the small bowel biopsies performed there on an outpatient basis are most likely closed biopsies.

Comparison with RAND classifications

The far-righthand column of Table 2 flags those DRG's that the Carter-Ginsberg project labeled as "DRG's with potential for outpatient substitution." Of the 35 surgical DRG's for which Manitoba hospitals treated 35 percent or more of their cases on an outpatient basis, only 11 were identified by the RAND study. The other procedures identified in the RAND study were procedures either not performed in Manitoba on an outpatient basis (as is true for prostatectomies) or performed less frequently than the 35-percent criterion required for inclusion in Table 2. They are listed in the "Technical note" for this article.

Discussion

In this article, we investigate the potential for inpatient and outpatient substitution by examining the proportion of cases in each DRG treated on an outpatient or short-stay basis in eight Manitoba hospitals. There was a lack of correspondence between the DRG's we identified as having substitution potential and the DRG's identified in the RAND study (Carter and Ginsberg, 1985).

Some of the differences in the DRG's identified by the two approaches may be attributed to the methods used to evaluate substitution potential. The RAND study appears to have selected those DRG's containing procedures known to be suitable for the ambulatory setting. For example, all of the procedures in DRG's 6, 232, 342, 361, and 362 are on Blue Cross and Blue Shield's list of reimbursable outpatient surgery (Sieverts, 1984). The DRG's identified in the RAND study therefore tended to have short lengths of stay and relatively low weights. These DRG's are candidates for outpatient shift; from a quality of care

perspective, it is important to monitor these DRG's under PRO outpatient review programs. However, lacking systematic data on outpatient surgery, the RAND analysis also missed many low-weight DRG categories in which a large proportion of cases are performed on an outpatient basis. Some of these may have been ignored because they account for so few cases (e.g., DRG 260–subtotal mastectomy, and DRG 313–urethral procedures).

By comparing the proportion of all hospital admissions with no overnight stay across DRG's, both the groups amenable to outpatient shift and those potentially susceptible to inpatient shift were identified. The data-based method used here flags those high-weight DRG's with patients treated on an ambulatory or short-stay basis as well as those treated during longer inpatient stays. Such DRG's tend to have a heterogeneous mix of patients, and close examination of length of stay by primary procedure may help to sort out this heterogeneity. Until these DRG's are so refined, hospitals can admit patients for selected procedures that could be performed on an ambulatory basis, thereby increasing their payments with few attendant expenses.

If Medicare's prospective payment system is extended to hospital outpatient services, the incentives to shift treatment setting are likely to be radically changed. Under the Omnibus Budget Reconciliation Act of 1986 (Public Law 99-509), the Secretary of Health and Human Services is required to develop and submit to Congress a prospective payment system for ambulatory surgical procedures in hospitals on an outpatient basis by April 1, 1989, and a system of prospective payment for outpatient services other than ambulatory surgical procedures by January 1, 1991. As an interim method (which began October 1, 1987), payments for outpatient hospital facility services associated with surgical procedures are the lesser of the amount the hospital would have received, based on reasonable costs, and a blend amount based on hospital cost (75 percent) and the ambulatory surgical center (ASC) rate (25 percent). In fiscal year 1989, the blend will be based on 50 percent hospital cost and 50 percent ASC rate. Payments to ASC's are based on prospectively set rates for specific procedures described in the April 21, 1987 *Federal Register.*

The approach to refining DRG's proposed in this article complements the efforts of others to improve the DRG classification system by developing measures of severity of illness. Approaches emphasizing the disease process tend to be most useful in identifying the severely ill or most complex types of patients to treat. On the other hand, those at the other end of the spectrum—short-stay, low-resource-use patients—could be identified by examining the procedures chiefly responsible for the inpatient admission. We suggest that some DRG's have subgroups of patients (short-stay outliers) admitted principally for diagnostic purposes. For many of these patients, once the test is administered and the results evaluated, discharge occurs within 1-3 days. The identification and appropriate classification of such procedures would limit the amount of potential gain for the hospital through inpatient shift.

This approach does not offer the extensive clinical refinement of systems such as Patient Management Categories (Young, 1984), Disease Staging (Gonella, Hornbrook, and Louis, 1984), the Medical Illness Severity Grouping System (Brewster et al., 1985), Acute Physiology and Chronic Health Evaluation (Wagner and Draper, 1984) or the Computerized Severity of Illness Index (Horn and Horn, 1986). However, Jencks and Dobson's (1987) recent review of these systems questions their ability to improve the basic DRG system, particularly given the requirements of special data abstraction that three of these systems impose. The methodology proposed here can identify distinct and meaningful patient categories within the context of the DRG system, without posing new coding requirements.

Understanding the potential role of inpatient-outpatient substitution in a DRG-based payment system is critical. The implementation of the inpatient prospective payment system may be partly responsible for the increased shift in surgery to the outpatient setting. According to a recent American Hospital Association survey, the percent of all surgeries performed on an outpatient basis in community hospitals rose from approximately 24 percent in 1983 to more than 40 percent in 1986 (American Hospital Association, 1987). In this article, we demonstrate that large numbers of surgical DRG's lend themselves to inpatient-outpatient substitution. Moreover, shifts across settings vary by DRG, depending on the financial incentives. The potential impact of future alternative outpatient systems clearly needs to be assessed, using both inpatient and outpatient utilization data so that potential abuses can be detected and/or avoided.

Technical note

The following are the diagnosis-related group (DRG) numbers and descriptions of the 23 procedures identified in the RAND study but not included in Table 2:

39 Lens procedures.
53 Sinus and mastoid procedures, patient age 18 years or over.
55 Miscellaneous ear, nose, and throat procedures.
161 Inguinal and femoral hernia procedures, patient age 70 years or over, and/or comorbidities or complications.
162 Inguinal and femoral hernia procedures, patient age 18-69 years, without complications or comorbidities.
187[1] Dental extractions and restorations.
221 Knee procedures, patient age 70 years or over, and/or comorbidities or complications.
222 Knee procedures, patient age under 70 years, without complications or comorbidities.
225 Foot procedures.
229 Hand procedures except ganglion.
261 Breast procedures for nonmalignancy except biopsy and local excision.

267 Perianal and pilonidal procedures.
310 Transurethral procedures, patient age 70 years or over, and/or complications or comorbidities.
320[1] Kidney and urinary tract infections, patient age 70 years or over, and/or complications or comorbidities.
321[1] Kidney and urinary tract infections, patient age 18-69 years, without complications or comorbidities.
322[1] Kidney and urinary tract infections, patient age 0-17 years.
328[1] Urethral stricture, patient age 70 years or over, and/or complications or comorbidities.
329[1] Urethral stricture, patient age 18-69 years, without complications or comorbidities.
336 Transurethral prostatectomy, patient age 70 years or over, and/or complications or comorbidities.
337 Transurethral prostatectomy, patient age under 70 years, without complications or comorbidities.
359 Tubal interruption for nonmalignancy.
361 Laparoscopy and endoscopy (female), except tubal interruption.
362 Laparoscopic tubal interruption.

[1]These DRG's represent medical rather than surgical DRG's and are therefore excluded from this analysis.

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