AMBULATORY VISIT GROUPS: HOW THEY PERFORM FOR ONCOLOGY OUTPATIENT DEPARTMENTS

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I. INTRODUCTION

A number of patient classification systems have been developed for use in ambulatory care settings over the past decade. The most prominent of these systems is the Ambulatory Visit Groups (AVGs), developed at Yale University under the direction of Robert Fetter. Based on the same premise as the Diagnosis Related Groups (DRGs), AVGs are designed to produce clinically meaningful clusters of patient visitsthat are relatively homogeneous in terms of clinical resource use.

The "first generation" of Yale groups was known as ambulatory patient-related groups (APGs). These have been described in the literature (Fetter, 1980, 1984; Knapp, 1983; Lion et al., 1984, Arbitman, 1986). They have not been widely used, however, and have been criticized on several grounds. In particular, they were developed from data limited to office-based practice through the National Ambulatory Medical Care Survey (NAMCS) (NCHS, 1982), although about a quarter of all ambulatory care visits are to non-office-based clinics, particularly hospital outpatient departments and emergency departments (Chyba, 1983).

Mitchell's (1982) and Henderson's (1985) work indicated that these first generation groups accounted for little variation in resource intensity, particularly when measures other than physician time per visit were considered. Arbitman, in fact, questioned the necessity of forming ambulatory groups at all since the cost of ambulatory visits to physicians' offices generally does not vary widely. All writers also cited the lack of clinical meaningfulness of the APGs as a major obstacle to their implementation by health care providers.

A second generation of ambulatory patient groups, now renamed ambulatory visit groups (AVGs) has become available from Yale in the last six months (Schneider et al., 1986). These groups, 571 in all, appear to perform substantially better than their predecessors. In particular, they have been designed to include visits to clinics in addition to office-based practices and are not necessarily limited to using physician time as the measure of resource use. Extending the ambulatory visit groups to clinics also removes one of the major objections to the concept of the groups -- that resource use does not vary significantly across groups of visits. The new AVGs span tertiary care specialties, emergency departments, and ambulatory surgery as well as primary care. With total direct costs used as the measure of resource use, they appear to have even more variation between the least and most expensive groups than do DRGs.

At present, the new ambulatory visit groups have been described fully in terms of their data requirements and have been evaluated for primary care (Lion, Malbon, and Bergman, 1987). They require only five basic data elements for their construction:

- primary diagnosis in ICD-9-CM
- procedures performed in CPT-4
- new versus established patient status
- patient age
- patient sex.

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For oncology only, a sixth variable, whether or not the patient was admitted to the hospital after the outpatient care, is required.

This present article examines AVGs for oncology, including medical oncology, radiation therapy planning, and radiation therapy. Although accounting for a relatively small proportion of ambulatory care visits, encounters for cancer care are among the most expensive types of ambulatory care visits. Furthermore, "high technology" oncology visits occur disproportionately in certain types of hospitals, i.e., major teaching hospital and cancer center outpatient clinics, and are likely to increase as more sophisticated cancer treatments, particularly chemotherapy, are more frequently performed on an outpatient basis.

This article has two purposes. It first provides a descriptive analysis of how the AVGs measure the case mix in oncology units at major teaching hospitals. Second, it examines how well AVGs perform as predictors of clinical resource use using three widely accepted measures. Implications for reimbursement under the AVGs are discussed.

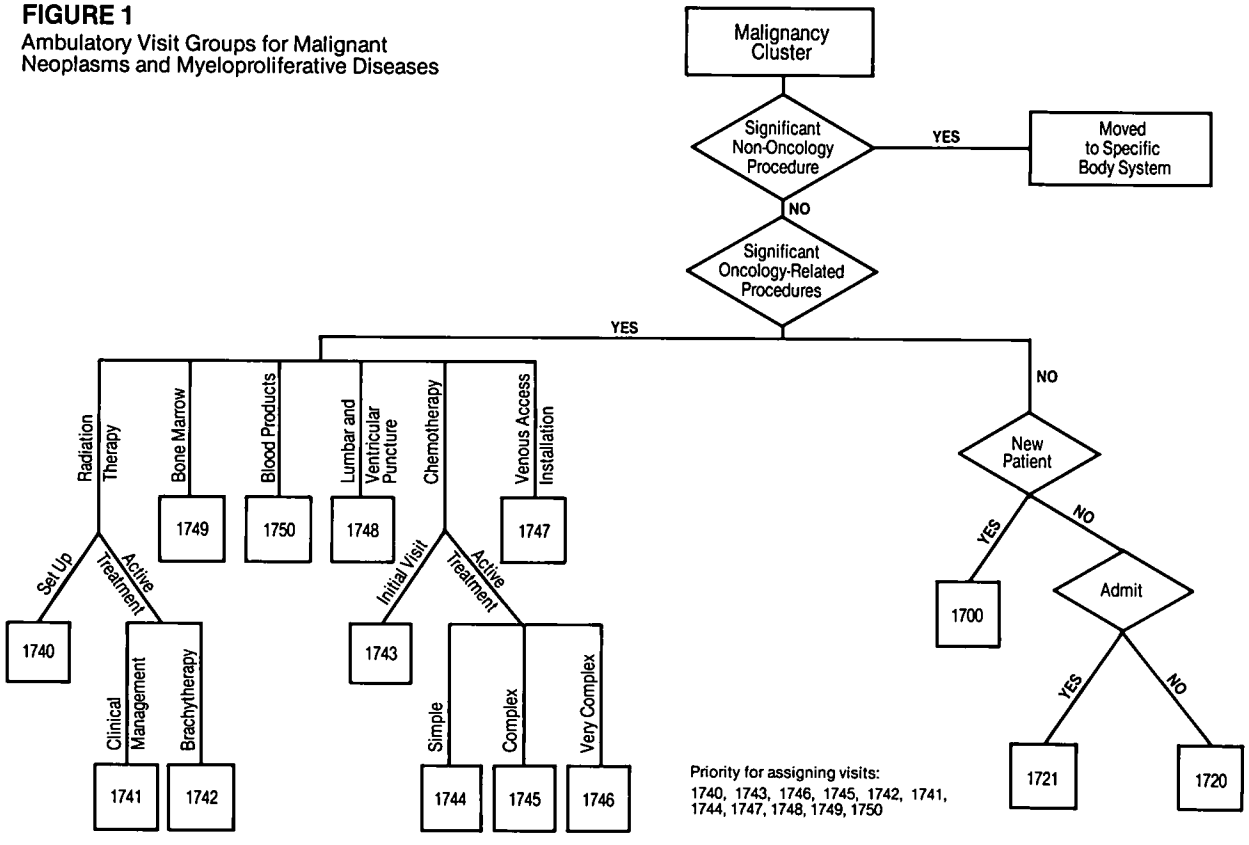
II. THE YALE AMBULATORY VISIT GROUPS FOR ONCOLOGY

In the currently existing DRG system, hospital discharges for oncology are spread over at least 80 of the 471 DRGs (Mortenson and Winn, 1984; Mortenson et al., 1985; Lion and Malbon, 1986). The AVGs are significantly different from the DRGs in this respect; 14 ambulatory visit groups are devoted exclusively to oncology. These groups are shown in Table 1 and are represented schematically in Figure 1. The AVGs shown are preliminary in certain ways, which do not affect their construction. For example, they are not numbered consecutively. Rather, as Table 1 shows, they are identified by their major diagnostic category, in this case 17, and then by a group number within this category.

The oncology AVGs are different from the other AVGs in several ways:

- The other major diagnostic categories are body system specific and cut across diseases while oncology AVGs are disease specific and cut across body systems.
- Most of the oncology groups are procedure driven. Biopsies and other procedures used to determine malignancy do not fall into the malignancy cluster but are moved back to the body system in question.
- A priority scheme is necessary for assigning visits which have more than one procedure to a particular group when they might otherwise fall into more than one group. This priority scheme is shown at the bottom

FIGURE 1
Ambulatory Visit Groups for Malignant Neoplasms and Myeloproliferative Diseases



of Figure 1. Procedures are defined with CPT-4 codes and the more costly procedure in terms of relative value units is always the one chosen.

III. METHODS

The data used here are from a survey similar to NAMCS in format but designed to collect data in considerably more detail. The questionnaire was used for all adult visits in two hematology-oncology units, one radiation therapy unit, and one radiation planning unit of major Boston teaching hospitals for a one-month period during 1985. Children under 18 were excluded from the data collection. There was a 96.3 percent questionnaire return rate overall. All four of the oncology units surveyed had salaried senior staff physicians rather than private practitioners.

In previous work using primary care data with the AVGs, total resource use per visit had been calculated as the sum of actual dollar value costs of provider time, tests, and procedures. Dollar value of tests and procedures had been calculated using the California relative value scale and Blue Shield prevailing charges. For the oncology data, however, it proved impossible to compute the dollar value of tests and procedures. The major difficulty in computing costs was that the most substantial oncology procedure, chemotherapy, did not have relative value units available for the cost of drugs. Billed charges, however, were accessible for the oncology visits. These charges included the actual charge for the chemotherapy drugs. For this reason, total billed charges including those for physician and provider time were substituted for calculated resource use for analysis of the oncology data.

Billing data were obtained for over 85 percent of the patients, and charges were estimated for about three-quarters of the patients for whom a bill was lacking. Total billed charges, of course, include overhead. Because of this, the charges in this present article for oncology AVGs cannot be used in an actual comparison with the direct costs calculated for primary care (Lion, Malbon and Bergman, 1987). Even assuming that about half of the billed charges represent overhead, it is still apparent that all of the oncology AVGs, with the exception of administration of radiotherapy, exceed in resources use all of the common primary care AVGs by a wide margin.

Excluding all visits which lacked primary diagnosis, provider time, or a charge that could be estimated, the final completion rate was 91.2 percent. This resulted in the 3,051 visits to be reported in this article. The excluded visits closely resembled the visits which were actually analyzed except that slightly more chemotherapy visits of all three levels of complexity were excluded. This was due to the difficulty of estimating chemotherapy drug charges when the bill was missing. This exclusion lowers the percent of visits for chemotherapy by less than one percent.

TABLE 1
Ambulatory Visit Groups for Malignancy
and Myeloproliferative Diseases

New Patient Groups		
17 : 00	-	Malignancy
Established Patient Groups		
17 : 20	-	Malignancy
17 : 21	-	Malignancy, Admit to hospital
Procedure Groups		
17 : 40	-	Radiation therapy-set-up
17 : 41	-	Radiation therapy-clinical management
17 : 42	-	Radium implant
17 : 43	-	Chemotherapy-initial visit prior to receiving
17 : 44	-	Chemotherapy-simple
17 : 45	-	Chemotherapy-complex
17 : 46	-	Chemotherapy-very complex
17 : 47	-	Vascular access installation for malignancy
17 : 48	-	Lumbar and ventricular puncture for malignancy
17 : 49	-	Bone marrow aspiration for malignancy
17 : 50	-	Blood products for malignancy

IV. RESULTS

A. Distribution of Visits in Oncology AVGs

The distribution of the 3,051 oncology visits into the 14 AVGs is shown in Table 2. Three of the 14 Yale oncology groups do not appear to be relevant to visits to oncology clinics. These are Group 1742 (radium implants), Group 1743 (initial visit prior to receiving chemotherapy) and Group 1747 (venous access installations). Groups 1742 and 1747 were not performed in any of the oncology clinics surveyed. They are performed either as inpatient procedures or in day surgery settings in the hospitals involved in this survey. Group 1743, initial visit prior to receiving chemotherapy, could not be distinguished from other visits for patients without a procedure in the data base. Medical staff members of surveyed clinics stated that the preparatory work-up for chemotherapy was, in fact, not provided in a separate visit in their clinics.

For the remaining 11 AVGs, the most common group was for old patients, who were not admitted to

the hospital after the visit, and who had no significant procedure requiring physician time. These patients, who actually represent follow-up care, accounted for 39.0 percent of all visits. New patients without a significant procedure accounted for an additional 5.4 percent of visits and patients without an outpatient procedure for 1.5 percent. In other words, although the oncology AVGs appear to be heavily procedure oriented, almost half of the actual visits to oncology clinics do not have a significant procedure according to the Yale definitions. This is because tests such as CAT scans, which do not require direct physician time, are not included in the procedure groups.

Procedures specific to oncology accounted for the remaining visits. Radiation therapy accounted for 28.6 percent of all visits, followed by the three administration-of-chemotherapy groups combined, which accounted for an additional 15.5 percent of all visits. Radiation planning accounted for 5.8 percent of visits, and transfusion of blood components for 2.9 percent of visits. The other two oncology-specific procedures (bone marrow aspiration and lumbar puncture) accounted for only one percent of all visits combined.

It is quite possible that some of the procedures for which only small numbers of cases are shown are more common in ambulatory surgery units or in emergency departments. Ambulatory surgery data and emergency department data, which meet the requirements of the AVGs do not appear to be available at present but are obviously required for a full examination of hospital clinic case-mix for oncology. One of the strengths of the new AVGs is that they will accommodate these procedures, no matter where performed, in the oncology group as long as the primary diagnosis is that of a malignancy.

TABLE 2

Distribution of Visits from Hospital Medical Oncology, Therapeutic Radiology, and Radiation Planning Clinics into Ambulatory Visit Groups

AVG	Description	Number of Visits	Percent of Visits
1700	New patient	164	5.4%
1720	Follow-up of established patient	1197	39.2
1721	Admit established patient to hospital	46	1.5
1740	Radiation therapy set-up	178	5.8
1741	Radiation therapy clinical management	872	28.6
1742	Radium implant	0	0.0
1743	Chemotherapy-initial visit	0	0.0
1744	Chemotherapy-simple	186	6.1
1745	Chemotherapy-complex	202	6.6
1746	Chemotherapy-very complex	86	2.8
1747	Venous access installation	0	0.0
1748	Lumbar and ventricular puncture	9	0.3
1749	Bone marrow aspiration	21	0.7
1750	Blood products	90	3.0
	TOTAL	3051	100.0%

B. Diagnostic Case Mix in Oncology

Unlike most of the Ambulatory Visit Groups, the oncology AVGs are not diagnosis-specific but rather are driven by the procedures performed on the patient once an oncology diagnosis has been established. It may be thought that diagnosis-specific ambulatory visit groups in oncology would explain as much of the variance as procedure-driven groups. This issue was examined and proved to be untrue. For informational purposes, however, Table 3 displays the distribution of leading diagnoses for the three types of clinics in the data base. Breast cancer is the leading diagnosis in all three types of clinics, but the other oncology diagnoses vary; leukemia, for example, is virtually absent from radiation planning and therapy but is the third leading diagnosis in medical oncology.

Using the Yale set of diagnoses for forming the malignancy and myeloproliferative disease AVGs, some actual visits to oncology units are screened out and reassigned to other major diagnostic categories. In terms of number of visits, this is a minor problem: only 5.2 percent of the visits in the data base did not make it through the Yale diagnostic screen.

The types of visits, which constitute this excluded 5.2 percent may, however, be surprising to hospital-based oncology units. The leading excluded diagnoses are hematological problems such as preleukemia, thrombocytopenia, and sickle cell anemia. These are covered under a hematology cluster in the new ambulatory visit groups, even though they appear to be, in the hospitals reported on here at least, seen in medical oncology clinics. Another excluded diagnosis is skin cancer (placed in the dermatology cluster for ambulatory visit groups) which is not seen in medical oncology OPDs but is one of the top ten diagnoses seen in radiation therapy units.

Two other excluded diagnoses are AIDS and follow-up care for neoplasms which have been proved to be benign as the result of a procedure. In the AVG system, AIDS is in a separate cluster with infectious diseases. Nevertheless, a substantial number of AIDS cases with secondary cancer diagnoses appear to be seen in medical oncology clinics. Follow-up visits after surgery for a neoplasm that proved to be

TABLE 3
Leading Diagnoses in Yale Oncology AVG Groups

Diagnosis	All Visits Number of Visits	Rank	Medical Oncology Number of Visits	Rank	Radiation Planning Number of Visits	Rank	Radiation Therapy Number of Visits	Rank
Breast cancer	1122	(1)	592	(1)	50	(1)	480	(1)
Lymphomas†	336	(2)	267	(2)	12	(4)	47	(5)
Head and neck cancer@	259	(3)	141	(5)	26	(2)	92	(2)
Lung cancer	223	(4)	142	(4)	25	(3)	56	(3)
Leukemias#	170	(5)	168	(3)				
Colon-rectal cancer	139	(6)	117	(6)	7	(8)	15	(9)
Prostate cancer	116	(7)	51	(8)	11	(5)	54	(4)
Unknown origin	115	(8)	88	(7)	9	(6)	18	(8)
Ovarian cancer	52	(9)	45	(10)				
Stomach cancer	49	(10)	47	(9)				
Pancreatic cancer							22	(6)
Uterine cancer							20	(7)
Skin cancer							15	(9)
Brain cancer					9	(6)		
Cervical cancer					7	(8)		
Other	470		343		22		53	
TOTAL	3051		2001		178		872	

†Includes Hodgkin's Disease
@Includes cancer of pharynx, larynx, esophagus, trachea, tongue, tonsil, mouth, and salivary glands as well as visits which were specified only as head and neck
#Excludes preleukemia

benign are also seen in oncology clinics. In the case of the AVGs, however, these visits are assigned to the body system cluster where the neoplasm was diagnosed.

C. Prediction of Resource Use

1. Physician Time

Physician time in minutes, total provider time in minutes, and total billed charges were analyzed by AVG. The results for physician time, ranked by minutes, are given in Table 4. Mean physician time was approximately 29 minutes. Fully one-third of the visits had no direct physician time and were dropped from the physician time portion of the analysis. Table 4 presents the percentage distribution of visits seen by a physician so that they can be contrasted with the percentage distribution in Table 2 for all visits. While all new patients are seen by physicians in oncology, only a minority of visits for transfusion of blood products, simple chemotherapy, and radiation therapy involve direct physician time. This is an important limitation to any attempt to use physician time for weighting ambulatory visit groups in a hospital-based setting.

For the 1,989 visits with physician time, the AVGs do reduce the overall amount of variation. As would be expected, new patients required the most physician time. Altogether, the AVGs accounted for 25 percent of the variation in physician time. This percent of "explained variance" compares favorably with the older version of the AVGs. Henderson (1985) found that only 15 percent of the variation in physician time was accounted for by the older version in a sample of primary care visits. Mitchell and Cronwell (1982) reported a similar low percentage in a study of cardiology visits.

Table 5 displays the standard deviations and coefficients of variance (CVs) for the individual AVGs. The coefficient of variation for all visits is only .72, indicating that there is not a great deal of variability in the entire data set of visits. Five of the AVGs had CVs of .50 or less and only one (radiation therapy) had a CV greater than that for the entire sample. All data presented in this article are untrimmed. The tightness of fit of the oncology AVGs compares favorably with that of the inpatient diagnosis related groups (DRGs).

2. Provider Time

Table 6 presents the results for all 3,051 visits with provider time, also ranked by mean minutes. The number of visits in the individual groups had previously been shown in Table 2. The mean provider time for all visits in the sample is approximately 37 minutes, about a quarter higher than the mean physician time alone.

Compared to using physician time, the hierarchy of visits using

provider time is very different. Complex chemotherapy, a procedure which requires relatively little physician time per visit in hospital OPDs, was the most provider time intensive. Blood product transfusions also had a longer provider time than average but a shorter than average physician time. In other words, for certain types of visits, for example those in which a lengthy procedure is performed by a nurse, physician time and total provider time are, at best, loosely related.

As with physician time, the AVGs appear to be fairly good predictors of provider time use. The groups together accounted for 33 percent of the variation. Standard deviations and CVs for the individual groups are also presented in Table 6. Compared to physician time, there is somewhat more variation in the entire sample as indicated by the CV of .84. Here again the visits in AVG 1741 (radiation therapy clinical management) had relatively more within group variation than the other groups. With this exception, the way AVGs explained physician time variation did not predict their explanation of provider time variation.

3. Total Charges

Table 7 presents data on total charges for all 3,051 visits by AVG. The mean charge for all visits is $276; the means for the 11 groups range from $761 for AVG 1750 (blood products) to $107 for AVG 1741 (radiation therapy clinical management). The AVGs appear to function best with total charges, explaining 36 percent of the variation. This is a strong indication that the groups, while technically designed to explain physician time, actually explain total resource use at least as well.

When the variation within the individual AVGs is examined for charges, all 11 groups are found to have a lower coefficient of variation than the overall CV, with radiation therapy clinical management performing well for the first time. Transfusion of blood products and

TABLE 4
Hierarchy of Physician Time for Oncology AVGs

AVG	Description	Mean Physician Time in Minutes	Percent Seen by a Physician	Number of Visits	Percent of Visits
1700	New patient	60.5	100.0	164	8.1
1749	Bone marrow aspiration	49.5	95.2	20	1.0
1748	Lumbar and ventricular puncture	37.8	100.0	9	0.5
1740	Radiation therapy set-up	35.5	70.8	126	6.3
1721	Admit to hospital	34.3	82.6	38	1.9
1746	Chemotherapy-very complex	29.2	72.1	62	3.1
1720	Follow-up of established patient	28.3	83.1	989	49.7
1744	Chemotherapy-simple	23.9	34.9	65	3.3
1745	Chemotherapy-complex	23.8	58.4	118	5.9
1750	Blood products	23.6	31.1	28	1.4
1741	Radiation therapy clinical management	17.9	41.7	364	18.3
	All Visits to physicians	29.4	65.2	1989	100.0

TABLE 5
Mean, Standard Deviation, and Coefficient of Variation for Minutes of Physician Time by AVG

AVG	Description	Mean Physician Time in Minutes	Standard Deviation	Coefficient of Variation
1700	New patient	60.5	31.7	0.52
1749	Bone marrow aspiration	49.5	32.4	0.65
1748	Lumbar and ventricular puncture	37.8	11.2	0.30
1740	Radiation therapy set-up	35.5	17.8	0.50
1721	Admit to hospital	34.3	18.8	0.55
1746	Chemotherapy-very complex	29.2	15.3	0.52
1720	Follow-up of established patient	28.3	12.0	0.42
1744	Chemotherapy-simple	23.9	9.7	0.41
1745	Chemotherapy-complex	23.8	9.6	0.40
1750	Blood products	23.6	13.3	0.56
1741	Radiation therapy clinical management	17.9	18.3	1.02
	All Visits	29.4	21.2	0.72

TABLE 6
Mean, Standard Deviation, and Coefficient of Variation for Minutes of Total Provider Time by AVG

AVG	Description	Mean Total Provider Time in Minutes	Standard Deviation	Coefficient of Variation
1746	Chemotherapy-very complex	111.6	41.5	0.37
1721	Admit to hospital	76.0	47.2	0.62
1700	New patient	64.3	32.5	0.51
1749	Bone marrow aspiration	56.1	31.8	0.57
1750	Blood products	55.0	40.6	0.74
1740	Radiation therapy set-up	54.1	34.7	0.64
1748	Lumbar or ventricular puncture	52.2	27.3	0.52
1745	Chemotherapy-complex	50.5	24.3	0.48
1720	Follow-up of established patient	31.6	23.1	0.73
1741	Radiation therapy clinical management	25.4	22.0	0.91
1744	Chemotherapy-simple	19.2	13.3	0.69
	All Visits	37.3	31.5	0.84

radiation therapy set up are also clustered fairly tightly (.37 and .39). The CV for simple chemotherapy increases, however, as one moves from physician time (.41) to provider time (.69) to total charges (.88). This is, of course, due to the great variation in the cost of chemotherapy drugs, independent of the time needed to administer the chemotherapy. The data base used here indicates that the variation in charge data could be further reduced if very expensive diagnostic procedures such as CT scans and extensive blood work were allowed to further split the AVGs. This is particularly true for the category for the follow-up care of established patients. Using the Yale system, this category comprises all patients who did not have a significant procedure requiring direct physician time. This category includes a minority of patients who had very expensive tests.

4. Relationship Among Provider Time, Physician Time, and Total Charges

The relationship among the three measures of resource use was examined in two ways: simple correlations and a non-parametric ranking test (the Kendall coefficient of concordance). The results of these two techniques are reported to conclude this section of the article.

The correlations among the three independent variables are modest at best, except for that between physician time and total provider time. This correlation (.63) is artificially high since only those 1,989 cases with at least some physician time were used in the comparison. This high correlation should not be misconstrued to suggest that physician time can be used as a proxy for provider time, particularly for the one-third of the visits which do not see a physician and which distribute quite differently on provider time than the visits which were used in calculating this correlation.

In view of the pressure that may very well ensue to use the second generation of ambulatory visit groups as a mechanism for either ambulatory case mix management or for reimbursement, the correlations in Table 8 might well be studied carefully. Although the previous tables have indicated that use of any of the three dependent variables will give a roughly similar tightness of fit for many of the groups, Table 8 indicates that which variable is used has a profound effect on the resource use attributed to some groups.

Table 9 summarizes the earlier information on the relationship between physician time, provider time, and total charges. A non-parametric statistical technique was modified to test if these apparent differences in ranking were statistically significant. The ranks shown in Table 9 were treated as scores and each AVG was ranked across these scores. For example, AVG 1700, new patient, was the most resource intensive for physician time, was third most intensive for provider time, but was only the eighth most intensive for total charges. These ranks were converted to 1, 2, and 3, and this process was repeated for the remaining AVGs. The results from a three-way comparison and from three pairwise comparisons of these ranked scores showed that the rankings of physician time, provider time, and total charges were all highly significantly different from one another ($p < .001$).

Although the AVGs were not developed specifically for reimbursement purposes, there is some speculation that, like the DRGs, they may be used for this purpose. In a reimbursement system, the relative weights that are attached to the AVGs would be an integral factor in determining the final price for an AVG. The data presented here lead to the inescapable conclusion that, because the rankings are so different depending on which dependent variable is used, the relative weights would also be greatly different.

V. CONCLUSIONS

This article has presented a first look at the second generation Yale ambulatory visit groups for oncology. The groups have many strengths. Unlike the first version of these groups, the current AVG system can accommodate data available from billing systems. Based on this limited study, they also appear to be fairly good predictors of resource use for at least one high-technology specialty using three widely accepted measures. Furthermore, the groups themselves are more clinically meaningful than the first generation scheme.

The major policy intent of this article has been to present detailed information about the dependent variables which could be used in weighting oncology outpatient care for the ambulatory visit groups. DRGs were first developed using length of stay as the original dependent variable and were later recalibrated using charges. The data analysis presented here suggests that, particularly for the high-technology ambulatory specialties such as oncology, resource use is best measured by total costs or charges rather than by a proxy for resource use such as physician time or total provider time. As with DRGs, the resource use measure chosen for AVGs will influence the weighting of the groups and, ultimately, case mix measures and reimbursement.

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TABLE 7
Mean, Standard Deviation, and Coefficient of Variation for Total Charges by AVG

AVG	Description	Mean Total Charge	Standard Deviation	Coefficient of Variation
1750	Blood products	$761.21	$281.79	0.37
1746	Chemotherapy-very complex	625.66	352.40	0.56
1749	Bone marrow aspiration	592.86	251.29	0.42
1740	Radiation therapy set-up	477.74	186.56	0.39
1721	Admit to hospital	415.17	237.11	0.57
1748	Lumbar and ventricular puncture	393.44	202.67	0.52
1745	Chemotherapy-complex	362.10	239.97	0.66
1700	New patient	346.13	267.91	0.77
1744	Chemotherapy-simple	283.28	248.75	0.88
1720	Follow-up of established patient	268.62	221.04	0.83
1741	Radiation therapy clinical management	106.63	62.80	0.59
	TOTAL	$275.69	$252.20	0.91

TABLE 8
Correlations Among the Three Dependent Variables

AVG	Group	Correlation Between Physician Time and Provider Time†	Correlation Between Physician Time and Total Charges†	Correlation Between Provider Time and Total Charges#
1700	New patient	0.96	0.22	0.25
1720	Follow-up of established patient	0.77	0.13	0.27
1721	Admit to hospital	0.16	-0.06	0.12
1740	Radiation therapy set-up	0.83	0.24	0.25
1741	Radiation therapy clinical management	0.83	0.15	0.26
1744	Chemotherapy-simple	0.73	0.25	0.33
1745	Chemotherapy-complex	0.49	0.14	0.35
1746	Chemotherapy-very complex	0.40	0.31	0.28
1748	Lumbar and ventricular puncture	0.91	0.52	0.47
1749	Bone marrow aspiration	0.90	0.12	0.25
1750	Blood products	0.11	0.02	0.30
	TOTAL	0.63	0.21	0.43

†Based on 1989 cases having both physician and provider time
#Based on 3051 cases having both provider time and total charges

TABLE 9
Rank Order of Physician Time, Total Provider Time, and Total Charges by AVG

AVG	Description	Rank of Physician Time	Rank of Total Provider Time	Rank of Total Charges
1700	New patient	1	3	8
1749	Bone marrow aspiration	2	4	3
1748	Lumbar and ventricular puncture	3	7	6
1740	Radiation therapy set-up	4	6	4
1721	Admit to hospital	5	2	5
1746	Chemotherapy-very complex	6	1	2
1720	Follow-up of established patient	7	9	10
1744	Chemotherapy-simple	8	11	9
1745	Chemotherapy-complex	9	8	7
1750	Blood products	10	5	1
1741	Radiation therapy clinical management	11	10	11

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