

# VARIATIONS IN CANCER DRG PROFIT AND LOSS BY HOSPITAL SIZE AND REGION OF THE NATION

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Over the past several years, ACCC has developed a series of analyses on diagnosis related groups (DRGs) at the national level. The number of hospitals included in these analyses has varied from 21 to 25. In this year's analysis, we have contributions from more than 90 institutions, which has allowed us to examine variations by both hospital size and region of the country.

A wide variety of publications have documented the fact that there are significant variations in patterns of care throughout the nation. These variations have been evident in a number of disease categories where significant variations in the types of treatment and the lengths of stay have been noted. With the institution of regional DRG rates, these variations have been reflected in hospital reimbursement. However, with the evolution of DRG reimbursement from largely regional- and hospital-based rates to national rates, it is likely that hospitals in high-cost regions are experiencing a profit crunch.

Recognizing the potential of analyses based on regional and hospital-size characteristics, a number of questions were addressed:

- What are the variations in charges, costs and reimbursement in each region?
- Are there significant differences in the profit and loss experience for different regions?
- Are there significant differences in the profit and loss experience for hospitals of different sizes?

In order to study these questions, we

have analyzed the data separately for each region and for hospitals of three different bed sizes. This article reports the results of these analyses for the 15 DRGs with the highest total gross reimbursement.

## REGIONAL PROFIT/LOSS DIFFERENCES

At the outset, it should be noted that not all of the 90 reporting institutions were involved in the analyses of regional and bed-size variations. In the first studies of regional differences, 47 institutions provided sufficient quality cost data and institutional information to permit the analyses to be undertaken. These 47 institutions were grouped into five regions of the country on the basis of zip code. Exhibit 1 below illustrates the characteristics of the five groupings.

### EXHIBIT 1 Regional Definitions

#### Northeast and Mid-Atlantic (NE)

- Zip codes 0, 1 and 2
- From Maine to South Carolina, including New York, Pennsylvania and West Virginia
- 12 hospitals

#### Southeast (SE)

- Zip code 3
- Mississippi, Tennessee, Alabama, Georgia and Florida
- 9 hospitals

#### Midwest (MW)

- Zip codes 4, 5 and 6
- From Ohio and Kentucky to Kansas and the Dakotas
- 14 hospitals

#### Southwest (SW)

- Zip codes 7 and 8
- From Arkansas and Louisiana to Arizona and Utah
- 3 hospitals

#### West

- Zip code 9
- Washington, Oregon and California
- 9 hospitals

Exhibit 2 at right and on page 18 illustrates the sample size, average (mean) profit and loss, average (mean) reimbursement, average (mean) cost, and total reimbursement by regional institutions for the 15 DRGs with the highest total gross reimbursement. A quick review of the average profit/loss column shows that there are wide variations, by region, in the amounts gained or lost for these 15 DRGs. For example, DRG 10 (nervous system neoplasms, age  $\geq 70$  and/or complications) provides institutions in the Midwest with an average profit of \$919, but in the Southwest, the same DRG generates an average loss of \$1,417.

Exhibit 3 on page 19 documents the extent of profit and loss variations for individual DRGs by region. For instance, DRG 410 (chemotherapy) has the smallest range of variation in profit and loss; a mere \$395. The DRG with the largest range of profit and loss variance is DRG 188 (other digestive system diagnoses, age  $\geq 70$  and/or complications). For this DRG, there is a \$3,198 difference, with institutions in the Southeast United States experiencing a greater loss than institutions in any other region.

Recognizing that the volume of use of various DRGs is an important factor in determining the total profit and loss, we calculated the average institutional profit and loss for each DRG by region. Exhibit 4 on page 19 illustrates the variation in the average institutional profit and loss for each of these major DRGs. Of course, this type of averaging does not account for variations within each of the regions, nor does it take into account case mix variations within individual institutions. Nonetheless, it seems safe to say that an institution is likely to show a profit on DRG 10 in the Midwest, and to lose money on the same DRG in the Southwest.

Exhibit 5 on page 19 illustrates the overall variation in average institutional profit and loss. Institutions that fall within the four Midwest zip codes generate a significant overall profit (\$67,677 per hospital) for these 15 DRGs, while institutions in the Northeast region generate a significant loss (-\$196,658 per hospital).

These regional differences, in part, may be attributable to historic differences in regional patterns of care or to variations in the costs of providing that care. For example, within DRG 10, differences in the range of reimbursement vary by as much as \$1,095, while differences in cost vary by as much as \$1,645. Reimbursement variations for DRG 82 (respiratory neoplasms) range as high as \$871, while the costs for delivery vary by as much as \$1,194.

DRG 188 displays some of the greatest variations in cost. Cost for this DRG is highest in the Southeast (\$6,172), with a

## EXHIBIT 2 Regional Variations in DRG Profit/(Loss)

Region	Number of Discharges	Average P/L	Average Reimbursement	Average Cost	Total Reimbursement
<i>DRG 10: Nervous system neoplasms, age <math>\geq 70</math> and/or complications</i>					
NE	214	\$ ( 367)	\$ 4,181	\$ 4,548	\$ 894,775
SE	132	( 311)	3,814	4,124	503,392
MW	195	919	4,909	3,990	957,226
SW	35	(1,417)	4,217	5,635	147,608
West	123	( 46)	4,636	4,682	570,209
<i>DRG 82: Respiratory neoplasms</i>					
NE	812	\$ ( 517)	\$ 4,536	\$ 5,054	\$ 3,683,491
SE	633	( 284)	3,665	3,950	2,320,120
MW	939	645	4,505	3,860	4,230,550
SW	176	339	5,042	4,703	887,413
West	431	( 287)	4,531	4,818	1,953,049
<i>DRG 172: Digestive malignancy, age <math>\geq 70</math> and/or complications</i>					
NE	380	\$ 51	\$ 4,257	\$ 4,205	\$ 1,617,898
SE	198	398	4,093	3,694	810,441
MW	311	750	4,422	3,673	1,375,385
SW	48	( 977)	3,951	4,928	189,652
West	128	600	4,541	3,941	581,308
<i>DRG 188: Other digestive system diagnoses, age <math>\geq 70</math> and/or complications</i>					
NE	293	\$ ( 658)	\$ 2,774	\$ 3,434	\$ 812,993
SE	214	(3,454)	2,717	6,172	1,320,753
MW	317	( 351)	3,106	3,457	984,491
SW	50	( 256)	2,475	2,731	123,752
West	162	(1,253)	2,820	4,073	456,866
<i>DRG 203: Malignancy of Hepatobiliary system or pancreas</i>					
NE	285	\$ 269	\$ 3,907	3,638	1,113,562
SE	168	( 314)	3,491	3,805	586,515
MW	251	757	4,159	3,402	1,043,953
SW	48	38	3,496	3,458	167,794
West	147	411	4,181	3,769	614,594
<i>DRG 239: Pathological fracture and musculoskeletal and connective tissue malignancy</i>					
NE	552	\$ ( 423)	\$ 3,522	\$ 3,945	\$ 1,914,352
SE	366	( 45)	3,087	3,131	1,129,709
MW	671	236	3,978	3,742	2,669,112
SW	109	( 385)	3,483	3,869	379,693
West	324	( 216)	3,926	4,142	1,272,030
<i>DRG 257: Total mastectomy for malignancy, age <math>\geq 70</math> and/or complications</i>					
NE	227	\$ 403	\$ 3,725	\$ 3,322	\$ 845,559
SE	248	( 109)	3,277	3,387	812,754
MW	290	547	4,102	3,556	1,189,650
SW	82	443	3,603	3,159	295,434
West	262	810	4,110	3,300	1,076,926

(Continued on next page)

**EXHIBIT 2 (Continued from page 17)**

Region	Number of Discharges	Average P/L	Average Reimbursement	Average Cost	Total Reimbursement
<b>DRG 303: Kidney, ureter and major bladder procedure for neoplasm</b>					
NE	111	\$ ( 167)	\$10,343	\$10,510	\$ 1,148,13
SE	79	(1,423)	9,042	10,465	714,303
MW	124	( 772)	10,484	11,256	1,300,031
SW	41	253	8,808	8,555	361,146
West	83	1,446	9,495	8,048	788,044
<b>DRG 395: Red blood cell disorders, age &gt;=18</b>					
NE	533	\$ ( 344)	\$ 2,872	\$ 3,216	\$ 1,531,004
SE	341	( 234)	2,488	2,722	848,481
MW	534	318	3,096	2,778	1,652,993
SW	80	( 166)	2,303	2,469	184,263
West	194	( 7)	2,862	2,869	555,257
<b>DRG 400: Leukemia/Lymphoma with major operating room procedure</b>					
NE	54	\$ 988	\$11,551	\$10,563	\$ 623,755
SE	49	(1,167)	7,837	9,004	384,011
MW	84	289	11,590	11,301	973,538
SW	15	( 354)	9,655	10,009	144,822
West	68	1,747	10,794	9,046	733,989
<b>DRG 401: Leukemia/Lymphoma w/minor OR proc., age &gt;=70 and/or complications</b>					
NE	150	\$ (2,309)	\$ 7,252	\$ 9,562	\$ 1,087,881
SE	72	( 787)	5,597	6,385	403,002
MW	63	( 106)	6,284	6,390	395,911
SW	14	(2,189)	8,774	10,963	122,830
West	37	695	6,751	6,055	249,792
<b>DRG 403: Leukemia/Lymphoma, age &gt;=70 and/or complications</b>					
NE	310	\$ (1,365)	\$ 5,219	\$ 6,585	\$ 1,618,107
SE	214	(1,789)	4,597	6,386	983,747
MW	378	( 816)	5,187	6,002	1,960,478
SW	53	(1,437)	4,431	5,868	234,891
West	189	( 371)	5,635	6,006	1,065,094
<b>DRG 408: Myeloproliferative disorder or poorly differentiated neoplasms w/minor OR procedure</b>					
NE	171	\$ ( 501)	\$ 4,294	\$ 4,795	\$ 734,339
SE	65	( 688)	3,157	3,846	205,237
MW	116	1,356	4,106	2,750	476,301
SW	49	467	3,383	2,916	165,767
West	119	125	4,635	4,509	551,520
<b>DRG 409: Radiation therapy</b>					
NE	275	\$ (1,416)	\$ 4,978	\$ 6,394	\$ 1,368,964
SE	45	1,101	3,318	2,216	149,293
MW	76	( 481)	3,733	4,214	283,718
SW	10	235	3,554	3,319	35,537
West	55	( 28)	3,501	3,529	192,551
<b>DRG 410: Chemotherapy</b>					
NE	1,831	\$ ( 53)	\$ 1,486	\$ 1,539	\$ 2,720,180
SE	854	93	1,346	1,252	1,149,567
MW	851	( 302)	1,714	2,016	1,458,328
SW	388	( 76)	1,472	1,548	571,101
West	1,057	( 73)	1,654	1,727	1,748,484

variation of \$3,441 per case. Reimbursement for this DRG is highest in the Midwest (\$3,106); however, the entire range of reimbursement in the five regions varies by no more than \$631.

**PROFIT AND LOSS DIFFERENCE BY HOSPITAL SIZE**

Forty-eight institutions provided sufficient information to compute variations in profit and loss by hospital bed size. In this analysis, region was not considered. Instead, variations that might be attributed to economies of scale were examined.

Exhibit 6 on page 20 summarizes the results of the analyses of the 15 DRGs with the highest total gross reimbursement. Institutions with fewer than 300 beds were reimbursed below cost in 9 of the 15 DRGs studied. Institutions with 300 to 500 beds also were reimbursed below cost in 9 of 15 DRGs. Institutions with more than 500 beds were reimbursed below cost in 4 of the 15 DRGs.

When the average number of institutional admissions and the average profit and loss are calculated for each of these DRGs, differences in profit and loss become more apparent (see Exhibit 7 on the next page). This weighted average suggests that hospitals with more than 500 beds are most likely to make a profit in each of the 15 DRG categories.

There are several explanations that come to mind when presented with the information compiled and calculated in this study. One of the most likely explanations for differences in profit and loss is that those institutions with more than 500 beds are most likely teaching institutions that receive supplemental revenue from the indirect teaching benefit. If this is the case, a compression in the profit margin of these institutions should be seen as that benefit is phased out over the next few years. However, it would be premature to dismiss the possibility that economies of scale are responsible for profit and loss variations in these institutions.

**ARE CANCER PROGRAMS FINANCIAL LOSERS?**

The data presented in this report are insufficient to determine the overall viability of cancer programs. Obviously, institutions in the Midwest with more than 500 beds are more likely to make a profit than institutions in the Northeast with 300 to 500 beds.

However, this statement does not take into account individual institutions' case mix or cost containment measures. Second, other studies that are being conducted demonstrate that these 15 DRGs account for only a portion of hospitals'

**EXHIBIT 3****Range of Profit/(Loss) for Top 15 DRGs  
(Based on Total Reimbursement)**

<i>DRG 188</i>	(\$ 256) to (\$ 3,454) = \$ 3,198
<i>DRG 400</i>	\$ 1,747 to (\$ 1,167) = \$ 2,914
<i>DRG 401</i>	\$ 695 to (\$ 2,189) = \$ 2,884
<i>DRG 303</i>	\$ 1,446 to (\$ 1,423) = \$ 2,869
<i>DRG 10</i>	\$ 919 to (\$ 1,417) = \$ 2,336
<i>DRG 403</i>	(\$ 371) to (\$ 1,789) = \$ 1,857
<i>DRG 408</i>	\$ 1,356 to (\$ 501) = \$ 1,857
<i>DRG 172</i>	\$ 750 to (\$ 977) = \$ 1,727
<i>DRG 257</i>	\$ 547 to (\$ 109) = \$ 656
<i>DRG 82</i>	\$ 645 to (\$ 517) = \$ 1,162
<i>DRG 203</i>	\$ 757 to (\$ 314) = \$ 1,071
<i>DRG 395</i>	\$ 318 to (\$ 344) = \$ 662
<i>DRG 239</i>	\$ 236 to (\$ 423) = \$ 659
<i>DRG 409</i>	\$ 1,101 to (\$ 1,407) = \$ 395

**EXHIBIT 4****Average Institutional Profit/(Loss)**

<b>DRG 10</b>		
NE	\$( 6,545)	
SE	( 4,565)	
MW	12,802	
SW	(16,536)	
West	( 634)	
<b>DRG 82</b>		
NE	\$(35,177)	
SE	(20,023)	
MW	43,287	
SW	19,893	
West	(13,736)	
<b>DRG 172</b>		
NE	\$ 1,639	
SE	8,763	
MW	16,657	
SW	(15,592)	
West	8,530	
<b>DRG 188</b>		
NE	\$(16,086)	
SE	82,134	
MW	( 7,952)	
SW	( 4,270)	
West	(22,554)	
<b>DRG 203</b>		
NE	\$ 8,471	
SE	( 5,866)	
MW	13,576	
SW	600	
West	7,558	
<b>DRG 239</b>		
NE	\$(19,459)	
SE	( 1,819)	
MW	11,317	
SW	(13,991)	
West	( 7,788)	
<b>DRG 257</b>		
NE	\$ 16,237	
SE	3,015	
MW	1,130	
SW	12,121	
West	23,578	
<b>DRG 303</b>		
NE	\$( 1,540)	
SE	(12,491)	
MW	( 6,839)	
SW	3,459	
West	13,339	
<b>DRG 395</b>		
NE	\$(15,296)	
SE	( 9,973)	
MW	12,119	
SW	( 4,415)	
West	( 152)	
<b>DRG 400</b>		
NE	\$ 4,447	
SE	( 8,171)	
MW	1,866	
SW	( 1,772)	
West	13,200	
<b>DRG 401</b>		
NE	\$(25,949)	
SE	( 8,098)	
MW	( 512)	
SW	596	
West	2,860	
<b>DRG 403</b>		
NE	\$(34,439)	
SE	(47,869)	
MW	(22,023)	
SW	(25,377)	
West	( 8,008)	
<b>DRG 408</b>		
NE	\$( 8,562)	
SE	( 5,591)	
MW	12,096	
SW	7,631	
West	1,871	
<b>DRG 409</b>		
NE	\$(43,248)	
SE	9,909	
MW	( 3,322)	
SW	1,175	
West	( 220)	
<b>DRG 410</b>		
NE	\$( 8,076)	
SE	10,018	
MW	(18,383)	
SW	( 9,868)	
West	( 9,637)	

**EXHIBIT 5****Average Institutional Profit/(Loss)  
by Region  
(Top 15 DRGs Based on Total  
Reimbursement)**

NE	\$ (183,583)
SE	( 10,627)
MW	65,819
SW	( 46,346)
West	( 8,207)

total discharges of cancer patients, and other DRGs may have a significant impact on the bottom line of the entire cancer program product line. Third, assuming that reimbursement for DRG and other fixed-price cancer patients results in roughly a "break-even" situation financially, it is likely that third-party payor patients add to the positive value of the product line.

In addition, if it is assumed that these cost estimates from hospital contributors take into account total institutional costs (both fixed assets and variable costs), cancer patients provide a substantial amount of income to offset hospital fixed costs and most, if not all, of the variable costs of their care. Given the large volume of cancer patient admissions (from 10 to 20 percent of discharges in many institutions), a break-even cancer program product line is essential if an institution is to maintain its asset base, as well as cover the annual variable costs of care. ■

**EXHIBIT 7****Average Institutional Profit/(Loss)  
by Bed Size  
(Top 15 DRGs Based on Total  
Reimbursement)**

Less than 300 beds	\$ ( 53,690)
300-500 beds	(115,764)
More than 500 beds	100,433

**EXHIBIT 6**  
**Variations in Profit and (Loss) for Institutions of Varying Bed Sizes**  
**(Top 15 DRGs Based on Total Reimbursement)**

<b>DRG</b>	<b>Bed Size</b>	<b>Number of Institutions</b>	<b>Number of Discharges</b>	<b>Average Profit/(Loss)</b>	<b>Average Institutional Profit/(Loss)</b>
<b>82</b>	<300	6	261	\$ ( 583)	\$ (25,360)
	300-500	24	1,388	( 380)	(21,977)
	>500	17	1,342	463	36,550
<b>403</b>	<300	6	89	( 366)	( 5,429)
	300-500	22	537	(1,670)	(40,763)
	>500	16	518	( 639)	(20,688)
<b>410</b>	<300	5	332	( 128)	( 8,499)
	300-500	24	2,939	( 219)	(26,818)
	>500	16	1,716	179	19,131
<b>10</b>	<300	6	55	610	5,592
	300-500	22	340	( 252)	( 3,895)
	>500	17	304	185	3,308
<b>172</b>	<300	6	108	23	414
	300-500	23	511	450	9,998
	>500	17	446	288	7,556
<b>188</b>	<300	6	104	( 695)	(12,064)
	300-500	22	519	900	21,232
	>500	17	413	( 425)	(10,325)
<b>203</b>	<300	6	64	( 191)	( 2,037)
	300-500	24	440	403	9,851
	>500	18	390	349	7,562
<b>239</b>	<300	6	184	( 107)	( 3,281)
	300-500	24	1,016	( 421)	(17,822)
	>500	17	822	297	14,361
<b>257</b>	<300	6	80	136	1,809
	300-500	24	549	221	5,049
	>500	17	480	707	19,970
<b>303</b>	<300	6	26	(2,213)	( 9,590)
	300-500	24	225	75	713
	>500	17	187	( 298)	( 3,278)
<b>395</b>	<300	6	113	( 177)	( 3,334)
	300-500	24	807	( 252)	( 8,474)
	>500	16	762	152	7,239
<b>400</b>	<300	5	19	1,537	5,841
	300-500	24	141	27	159
	>500	15	110	916	6,717
<b>401</b>	<300	5	13	1,156	3,005
	300-500	23	189	(1,434)	(11,784)
	>500	16	116	( 786)	( 5,698)
<b>408</b>	<300	3	29	549	5,307
	300-500	23	259	( 772)	( 8,693)
	>500	16	232	1,072	15,544
<b>409</b>	<300	4	31	( 783)	( 6,068)
	300-500	17	322	(1,190)	(22,540)
	>500	13	108	299	2,484