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ISSUE BRIEF 2

Low Consumption and Higher Medicare Cost: Consumption Clusters in a Medicare Fee-for-Service Population

Analysis suggests that beneficiaries with chronic diseases who are low consumers of benefits tend to cost Medicare significantly more in the near term.

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Executive Summary

An analysis of Medicare claims data covering a six-year period provides strong signals that Medicare beneficiaries with chronic diseases on whom Medicare spends the least are a major factor contributing to rising costs. Results from this analysis show that beneficiaries with diabetes who consume the least—as evidenced by the level of reimbursement associated with their care—are more likely to cost the program significantly more in the short term. For example, in 2004, 60% of all Medicare Fee-for-Service beneficiaries with diabetes received \$1,500 or less for their care. Within a short period, the cost associated with these low consumers exploded by 580%, as they required avoidable emergency and inpatient care.

Particularly striking is a potential correlation between the amounts that Medicare reimbursed for the care of beneficiaries with chronic diseases in any given year and future costs.

Earlier research has documented that a relatively small number of beneficiaries—on an annual basis and over time—consume most of the Medicare budget. This research may have conveyed the impression that it is quite literally the same individuals with persistent high medical cost who have a determinative impact on the Medicare budget. The analysis of Medicare beneficiaries' consumption patterns summarized in this Issue Brief found that only a small fraction of beneficiaries are persistent high consumers of Medicare benefits, and these individuals have a relatively small impact on the Medicare budget.

Particularly striking is a potential correlation between the amounts that Medicare reimbursed for the care of beneficiaries with chronic diseases in any given year and future costs. These findings have resource-management implications that warrant further investigation.

Medicare beneficiaries fall into discernible consumption patterns. Medical consumption patterns, like other consumer patterns, are not random. There is a consistency to them that may be understood and exploited to improve quality while bringing down cost. In reviewing these consumption patterns, there is ample evidence that in the immediate future, significant increases in reimbursements may be anticipated for those beneficiaries with diabetes who rank among the lowest consumers of benefits in a

prior year. It is likely that similar patterns exist for those with other chronic diseases.

The key findings in this study are as follows:

- Medicare beneficiaries may be clustered into five consumption groups (crisis consumers, heavy consumers, moderate consumers, light consumers, and low consumers), based upon how much Medicare reimbursed for services provided them in any year. These are dynamic clusters, whose membership changes significantly from one year to the next.
- The two most-costly clusters are crisis consumers and heavy consumers. They represent only 11% of Medicare beneficiaries, but 65% of all costs.
- Each year, movement from the less-costly clusters (moderate consumers, light consumers, and low consumers) to the two most-costly clusters (crisis consumers and heavy consumers) drives cost increases in Medicare.
- Only a small percentage of crisis and heavy consumers are persistent high consumers, who continue to require expensive medical services the following year. Low-consumer diabetics are likely to cost Medicare significantly more in the near term.
- The rise in the cost for low-consuming diabetics not only offsets savings that might be achieved by the reductions in reimbursements for crisis and heavy consumers, but actually causes a total rise in cost for all diabetics from one year to the next.
- Future research is warranted to determine whether other values (age, race, gender, geography, clinical) may signal opportunities for intervention to reduce avoidable emergency and inpatient care.

There is a clear need to understand consumption patterns in Medicare. Questions that warrant further investigation include the following:

- How are beneficiaries—particularly those with chronic diseases—using the benefits?
- Can low consumption patterns be associated with undertreatment?
- What drives their consumption?
- Can planners use stability in consumption to anticipate utilization?

By understanding the consumption patterns of Medicare beneficiaries, we can build a 21st-century health-care system that is patient centered, proactive (built to anticipate risk and to reduce acute events through early interventions and improved chronic-care management), and capable of bringing a calculable return on investment. ■

An analysis of Medicare claims data covering a six-year period provides strong signals that Medicare beneficiaries with chronic diseases on whom Medicare spends the least are a major factor contributing to rising costs. Results from this analysis show that beneficiaries with diabetes who consume the least—as evidenced by the level of reimbursement associated with their care—are more likely to cost the program significantly more in the short term. For example, in 2004, 60% of all Medicare Fee-for-Service (FFS) beneficiaries with diabetes received \$1,500 or less for their care. Within a short period, the cost associated with these low consumers exploded by 580%, as they required avoidable emergency and inpatient care.

This Issue Brief presents evidence that only a small fraction of beneficiaries are persistently high consumers of benefits, and these individuals have a relatively small impact on the Medicare budget.¹ Beneficiaries with chronic diseases who are underutilizing benefits cost Medicare more in the near term.

In the aggregate, Medicare beneficiaries exhibit discernible consumption patterns. Understanding these patterns has potential for improving quality while reducing cost. By segmenting Medicare beneficiaries into clusters based on expenditures, these patterns become evident. The patterns offer some ability to predict future cost. The findings summarized in this Issue Brief suggest that health-care consumption patterns are not entirely random: They have measurable, stable spatial and temporal characteristics that may serve as metrics to identify and project costs for clusters of beneficiaries. Models based on these projections could guide progress away from a reactive, acute-care system that is expensive and that breeds recrimination and toward a patient-centered, proactive system that uses probability matrices to mitigate acute events through highly targeted interventions, reducing costs while improving care and quality of life. Constructing a health-care system that is proactive (built to anticipate risk and to reduce acute events through early interventions), yet capable of bringing a calculable return on investment by trimming costs, will be difficult, but not impossible.

In 2005, Senate Majority Leader Trent Lott asked the Congressional Budget Office (CBO) to undertake a study “focusing on the small group of beneficiaries that accounts for a large share of the program’s spending” and to consider intervention strategies that could reduce that spending.² CBO analyzed the concentration of Medicare spending, using data from Medicare claims, and considered illustrative methods for identifying beneficiaries likely to incur high costs. The analysts

observed “a significant degree of concentration in the spending of Medicare beneficiaries, both in a given year and over time. For example, high-cost beneficiaries (those in the top 25 percent in terms of their spending) accounted for 85 percent of annual expenditures in 2001 and for 68 percent of five-year cumulative expenditures from 1997 to 2001. In addition, those high-cost beneficiaries, compared with beneficiaries in the bottom 75 percent in terms of their spending, were slightly older, more likely to suffer from chronic conditions, such as coronary artery disease and diabetes, and more likely to die in a given year.”

On the question of “whether a strategy of focusing on high-cost beneficiaries could lead to significant reductions in overall Medicare spending,” CBO concluded that it “would depend on two factors: the ability to identify individuals who will have high costs in the future and the ability to mitigate those high costs. The existence of Medicare beneficiaries whose high spending persists over an extended period presents potential opportunities for intervention strategies.” However, it would be difficult to identify such individuals prospectively. Whether the difficulties are real or imagined, there has been little systematic effort to profile these more-costly patients with the specific purpose of anticipating their needs so as to manage rising costs in Medicare more effectively.

Objective

This Issue Brief builds upon the observations of the CBO study by reviewing medical-consumption patterns in the Medicare FFS population generally and then by analyzing expenditure patterns for those beneficiaries with diabetes. The intent is to start a process by which Medicare can become more proactive by anticipating the needs of beneficiaries who are most likely to become high-cost beneficiaries.

Sources, Study Design, and Methods

The study described in this Issue Brief focused on consumption patterns in the Medicare FFS population through a review of the Medicare Beneficiary Annual Summary Files for the years 2000 through 2005. Total Medicare expenditures for each beneficiary were determined by calculating the sum of all reimbursements made for inpatient and outpatient care, skilled-nursing facilities, durable medical goods, and home health and hospice care during each calendar year. Beneficiaries with total Medicare reimbursement below 0 were included in this analysis. It is not clear why some

beneficiaries had negative reimbursement values, but the number was negligible, with no impact on the findings, so the determination was made to keep them in the analysis. If a beneficiary died during the study period, the date of the death was that provided in the summary file. For each year, the study included beneficiaries enrolled in Medicare Part A and Part B for at least one month and excluded all beneficiaries enrolled in

Medicare Part C (a Medicare managed-care program) due to the lack of complete reimbursement data. Beneficiaries were assigned unique identifiers and on the basis of their Medicare expenditures were grouped into one of five mutually exclusive consumer clusters: crisis consumers, heavy consumers, moderate consumers, light consumers, and low consumers. Table 1 shows the expenditure range associated with each cluster by year.

Table 1. Concentration of Medicare Expenditures by Consumer Cluster

Year	Cluster	Beneficiaries		Expenditures		
		No.	%	Cluster Range	Total	%
2000	Crisis Consumers	314,052	1	≥\$60,870.88	\$29,312,100,000	17
	Heavy Consumers	2,826,461	1–10	\$15,312.23–\$60,870.87	\$81,065,500,000	48
	Moderate Consumers	4,710,773	10–25	\$3,969.13–\$15,312.22	\$37,857,200,000	22
	Light Consumers	7,851,324	25–50	\$941.65–\$3,969.12	\$15,743,300,000	9
	Low Consumers	15,702,516	50	≤\$941.64	\$4,512,371,915	3
	Total		31,405,126			\$168,490,471,915
2001	Crisis Consumers	324,594	1	≥\$65,251.72	\$32,466,000,000	17
	Heavy Consumers	2,921,347	1–10	\$16,735.80–\$65,251.71	\$90,540,400,000	48
	Moderate Consumers	4,868,914	10–25	\$4,471.74–\$16,735.79	\$43,293,500,000	23
	Light Consumers	8,114,898	25–50	\$1,091.88–\$4,471.73	\$18,603,700,000	10
	Low Consumers	16,229,644	50	≤\$1,091.87	\$5,475,979,227	3
	Total		32,459,397			\$190,379,579,227
2002	Crisis Consumers	336,017	1	≥\$68,285.81	\$35,266,900,000	17
	Heavy Consumers	3,024,135	1–10	\$17,704.22–\$68,285.80	\$98,612,100,000	47
	Moderate Consumers	5,040,235	10–25	\$4,736.82–\$17,704.21	\$47,403,300,000	23
	Light Consumers	8,400,427	25–50	\$1,181.00–\$4,736.81	\$20,540,600,000	10
	Low Consumers	16,800,697	50	≤\$1,180.99	\$6,206,953,638	3
	Total		33,601,511			\$208,029,853,638
2003	Crisis Consumers	343,785	1	≥\$70,263.98	\$36,926,600,000	16
	Heavy Consumers	3,094,062	1–10	\$18,890.84–\$70,263.97	\$105,678,000,000	47
	Moderate Consumers	5,156,769	10–25	\$5,150.85–\$18,890.83	\$52,270,400,000	23
	Light Consumers	8,594,604	25–50	\$1,300.75–\$5,150.84	\$23,056,800,000	10
	Low Consumers	17,189,220	50	≤\$1,300.74	\$7,025,057,531	3
	Total		34,378,440			\$224,956,857,531
2004	Crisis Consumers	348,745	1	≥\$74,968.86	\$39,404,600,000	16
	Heavy Consumers	3,138,703	1–10	\$20,445.21–\$74,968.85	\$115,081,000,000	47
	Moderate Consumers	5,231,179	10–25	\$5,621.61–\$20,445.20	\$57,743,400,000	23
	Light Consumers	8,718,631	25–50	\$1,454.62–\$5,621.60	\$25,866,300,000	11
	Low Consumers	17,437,221	50	≤\$1,454.61	\$7,985,272,041	3
	Total		34,874,479			\$246,080,572,041
2005	Crisis Consumers	347,371	1	≥\$78,413.06	\$41,286,700,000	16
	Heavy Consumers	3,126,334	1–10	\$21,587.44–\$78,413.05	\$120,103,000,000	46
	Moderate Consumers	5,210,552	10–25	\$6,036.48–\$21,587.43	\$61,359,100,000	24
	Light Consumers	8,684,264	25–50	\$1,584.90–\$6,036.47	\$27,776,000,000	11
	Low Consumers	17,368,501	50	≤\$1,584.89	\$8,703,889,658	3
	Total		34,737,022			\$259,228,689,658

It also reports the number of beneficiaries in the cluster by year, the total dollars spent on that cluster, and the percentage of Medicare expenditures represented by those total dollars.

The bottom of each year's expenditure range for *crisis consumers* was established by determining the minimum aggregate payments made on behalf of the 99th percentile (the top 1%) of beneficiaries, for whom Medicare reimbursements were the greatest. The top of the range for *low consumers* was determined by calculating the maximum annual expenditures made for the lower 50th percentile of Medicare beneficiaries. The range for *heavy consumers* was bracketed at the bottom by the minimum payment for the 90th percentile and at the top by the minimum payment for crisis consumers. *Moderate consumers* were clustered between the minimum payment for heavy consumers at the top and the minimum payment for the upper quartile (the 75th percentile) at the bottom. Light consumers were those whose expenditures fell below the minimum payment for moderate consumers and above the top of the range for low consumers.

This study followed membership in the clusters over time, distinguishing persistent members from recruits. A *persistent member* was a beneficiary whose expenditures placed him or her in the same cluster in two consecutive years. A *recruit* was a beneficiary whose expenditures placed him or her in a cluster different from the prior year's.

Expenditures for persistent members were tracked separately to determine persistent groups' aggregated costs to the Medicare system. (A *persistent group* was defined as a group of beneficiaries who remained in a defined cluster for at least two years.) For the initial year of the study, 2000, beneficiaries in the clusters were treated as composites of persistent members and recruits, because some members of each cluster probably had been in the same cluster in 1999 and their presence would influence the cluster's patterns of persistence and cost. The consumer groups that began in the years 2001 through 2005, however, all began with recruits, because any persistent members would have been captured and tracked in the 2000 clusters.

Using unique beneficiary identifiers, the Beneficiary Annual Summary Files were linked to the Medicare's Chronic Condition Data Warehouse (CCW) flags.³ These flags identified beneficiaries for whom Medicare provided reimbursements for one of twenty-one common chronic conditions. The CCW flags were used to isolate and study beneficiaries who were identified as having diabetes in the five clusters. By linking summary cost for each beneficiary from the

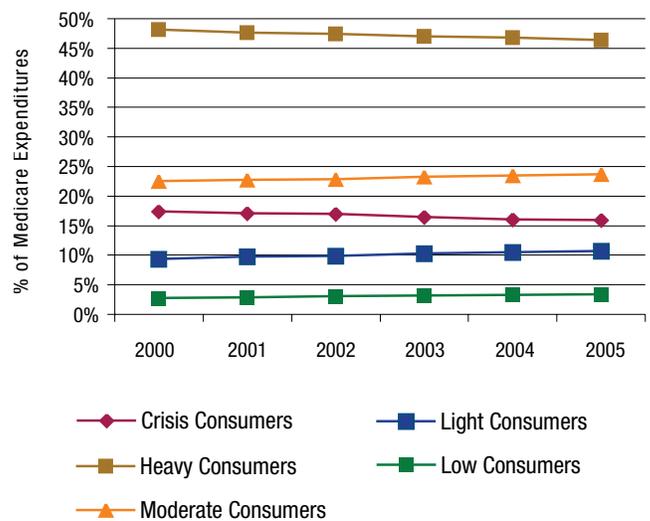
Beneficiary Annual Summary Files with CCW flags, it was possible to compute total expenditures for beneficiaries with diabetes. We could not capture cost solely related to the treatment of diabetes in those beneficiaries; we captured all expenditures for a beneficiary with diabetes in a given year.

Findings

Concentration of Expenditures

Figure 1 shows concentrations of Medicare reimbursements from 2000 through 2005. It charts the expenditures in the five clusters by their shares of annual Medicare expenditures. Over time, concentration patterns were stable, although trend tests indicate relative drops in proportion for heavy and crisis users and relative rises in proportion for moderate, light, and low consumers. Each year, about 17% of all expenditures were attributable to approximately 300,000 crisis consumers. The heavy consumers (about 3 million beneficiaries) received about 48% of the program's annual expenditures, whereas moderate, light, and low consumers (who represented 90% of all beneficiaries) accounted for about 23%, 11%, and 3%, respectively. Although the concentration of expenditures among a small proportion of beneficiaries comports with previous studies, it should not be interpreted as the continued presence of the same individuals in the high-cost clusters, which in fact were dynamic. Each year, the clusters comprised substantial numbers of new members.

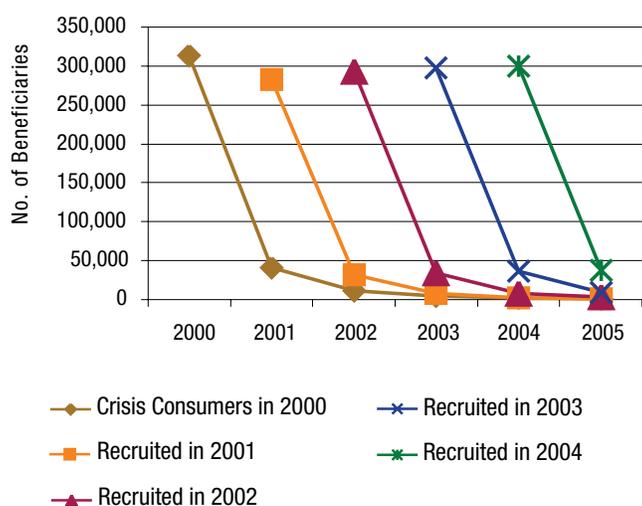
Figure 1. Concentrations of Expenditures in Consumer Clusters



Migration and Persistence

Recruits to the higher-expenditure clusters (crisis, heavy, and moderate consumers) had the greatest impact on Medicare expenditures. Figure 2 plots persistence for crisis consumers. The most telling feature about crisis consumers was that only a small percentage of them were persistent. In 2000, there were 314,052 crisis consumers; only 13% of them persisted in the cluster into 2001, and by 2003 the proportion who persisted from 2000 had dropped to 3%. By the end of the study, in 2005, less than 1% of 2000's crisis consumers were still in the cluster. Among new crisis consumers from 2001 through 2004, 88% dropped out of the cluster by 2002. An additional 9% left the group by 2003, leaving 3% as a residual population.

Figure 2. Persistence of Crisis Consumers



Deaths accounted partially for the relatively low persistence in the most expensive cluster. About 30% of crisis consumers died in the first year. A drop in expenditures was, however, the dominant factor influencing persistence in the cluster. Approximately 58% survived, but expenditures declined to the extent that they fell below the cluster's baseline the following year. The mean expenditure for crisis consumers in 2000 was \$88,081; in 2001, those who did not die but who did not persist in the crisis cluster had a mean expenditure of \$22,364. Similar declines in mean expenditures were found for nonpersistent crisis consumers in 2001, 2002, and 2003. While there were significant drops in their medical expenditures, former crisis consumers remained some of Medicare's more costly beneficiaries; for example, 51% of 2000's crisis consumers became heavy consumers and 27% became moderate consumers in 2001. Apparently, a significant

percentage of crisis consumers had an expensive intervention in one year, but the level of those costs did not persist over time, though these former crisis consumers did require significant medical follow-up. The importance of crisis-consumer recruits in Medicare expenditures is illustrated in Table 2. Of the \$41 billion spent on crisis consumers in 2005, 84% (\$35 billion) was spent on 296,971 recruits.

Yearly growth of the crisis-consumer cluster was due to the influx of patients from other clusters. Identifying the patterns of migration from the other clusters into the crisis-consumer cluster may be a first step toward profiling crisis-consumer recruits. Table 3 reviews migration into the crisis-consumer cluster for 2001 through 2003. In each year, about 39% of the new crisis consumers came from heavy consumers, 24%

Table 2. Importance of Crisis-Consumer Recruits for Medicare Expenditures, 2005

Persistence as Crisis Consumers	2005 Expenditures (%)
Persistent since 2000	\$238,016,354 (1%)
Persistent since 2001	\$170,270,381 (0.4%)
Persistent since 2002	\$409,837,957 (1%)
Persistent since 2003	\$1,222,518,630 (3%)
Persistent since 2004	\$4,598,868,583 (11%)
Recruited in 2005	\$34,644,306,673 (84%)
Total	\$41,283,818,578 (100%)

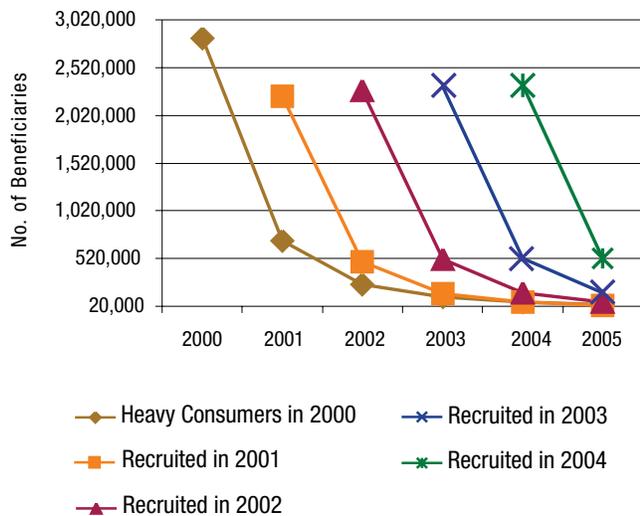
Table 3. Crisis-Consumer Migration Patterns, 2001 through 2003

Year	Crisis-Consumer Recruits		
	Source	No.	%
2001	Heavy Consumers 2000	102,257	39
	Moderate Consumers 2000	64,477	24
	Light Consumers 2000	52,226	20
	Low Consumers 2000	46,583	18
	Total	265,543	100
2002	Heavy Consumers 2001	106,116	39
	Moderate Consumers 2001	66,949	24
	Light Consumers 2001	53,319	19
	Low Consumers 2001	48,057	18
	Total	274,441	100
2003	Heavy Consumers 2002	111,675	40
	Moderate Consumers 2002	69,593	25
	Light Consumers 2002	53,239	19
	Low Consumers 2002	47,999	17
	Total	282,506	100

came from moderate consumers, 20% came from light consumers, and 18% came from low consumers. This stable pattern suggests that a more detailed profile may help to identify beneficiaries with potential for the greatest impact on the Medicare budget.

Persistence among heavy consumers was almost double that among crisis consumers. Heavy consumers should be of particular interest, because they absorbed about 48% of Medicare expenditures. There were slightly more than 3.1 million heavy consumers in 2000, but 70% of them did not persist into 2001 (Figure 3). About 58% of heavy-consumer recruits in 2001 and 2002 did not persist in the cluster the following year, and less than 1% remained for five years. On average, about 22% of heavy-consumer recruits died in the first year, but a drop in medical expenditures was the greater force influencing nonpersistence. In 2000, the mean expenditure for heavy consumers was \$27,611. In 2001, \$11,282 was the mean for those who survived, but who did not persist as heavy consumers. Similar declines in persistence among heavy consumers were evident in 2002 and 2003. The mean expenditure for nonpersistent 2001 heavy consumers went from \$29,370 to \$10,158 (within the range for moderate consumers) in 2002. Consistently, about 4% of first-year heavy consumers became crisis consumers the following year, thus accounting for about 21% of each year's crisis consumers.

Figure 3. Persistence of Heavy Consumers



As with crisis consumers, the majority of heavy consumers each year were recruits from other clusters. Table 4 reviews migration into the heavy-consumer cluster for 2001 through 2003. In each year, about

4% of heavy-consumer recruits came from crisis consumers, 34% came from moderate consumers, 32% came from light consumers, and 30% came from low consumers. There may be some underlying characteristics (disease profile, therapies, age, race/ethnicity, and geography) that inform these patterns. The signals are worth exploring, because they might point toward interventions to retard migration into more-expensive clusters.

Table 4. Heavy-Consumer Migration Patterns, 2001 through 2003

Year	Heavy-Consumer Recruits		
	Source	No.	%
2001	Heavy Consumers 2000	90,304	4
	Moderate Consumers 2000	694,498	34
	Light Consumers 2000	657,617	32
	Low Consumers 2000	626,871	30
	Total	2,069,290	100
2002	Heavy Consumers 2001	63,441	4
	Moderate Consumers 2001	580,248	33
	Light Consumers 2001	566,265	32
	Low Consumers 2001	534,892	31
	Total	1,744,846	100
2003	Heavy Consumers 2002	96,761	4
	Moderate Consumers 2002	752,365	34
	Light Consumers 2002	688,089	31
	Low Consumers 2002	652,462	30
	Total	2,189,677	100

The stability of the clusters in the Medicare FFS general population was also evident among FFS beneficiaries who were diabetic. Table 5 shows the percentage of diabetics in each cluster from 2000 through 2005. Although there was an increase in the overall prevalence of FFS diabetics, the percentage of diabetics in the each cluster remained fairly stable.

Table 5. Medicare Diabetics in Consumer Clusters

Consumption Group	Percentage of Beneficiaries Who Were Diabetic					
	2000	2001	2002	2003	2004	2005
Crisis Consumers	33	33	34	36	38	38
Heavy Consumers	25	26	26	28	29	30
Moderate Consumers	22	23	23	25	26	27
Light Consumers	20	20	21	22	23	24
Low Consumers	10	10	10	11	12	12

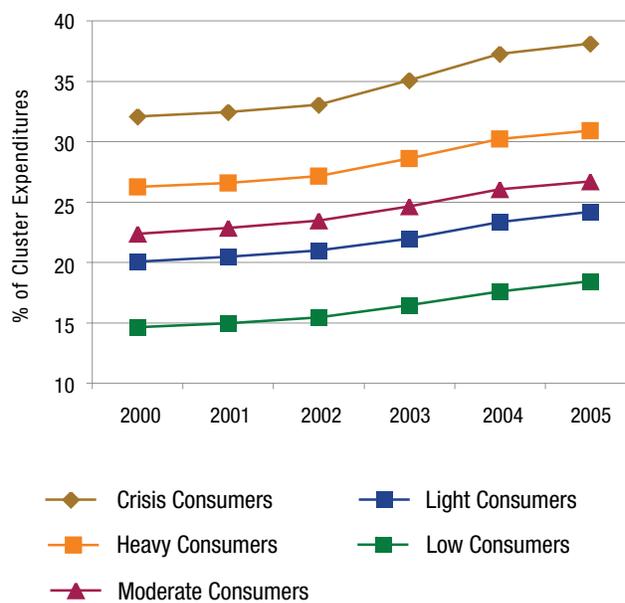
Figure 4 suggests that, even though cluster consumption patterns remained stable, within each cluster more was being spent on FFS diabetics. In 2000, 25% of total expenditures went to reimbursement for beneficiaries with diabetes; in 2005, diabetics in total consumed 30%.

Low Consumption Patterns and Rising Cost

One of the more intriguing features about Medicare consumption patterns is a possible association between low consumption of benefits and a rise in Medicare cost. Table 6 compares expenditures on beneficiaries in a cluster during one year against expenditures on beneficiaries from that cluster in the succeeding year. The comparison periods are 2000 to 2001, 2001 to 2002, and 2002 to 2003. Not reported in the table are any beneficiaries who died before the succeeding year. Also excluded are any beneficiaries who lost coverage or enrolled in a Medicare Part C program during any of the study periods. As a consequence, 7% of year 2000 beneficiaries, 14% of year 2001 beneficiaries, and 15% of year 2002 beneficiaries are not included in the table.

Table 6 provides further documentation that the clusters exhibited fairly stable consumption patterns, but it also calls attention to the possibility

Figure 4. Diabetic Consumption as Percentage of Cluster Expenditures



that underutilization of benefits may have been a factor contributing to higher Medicare costs. In each of the years studied, there was a substantial drop in expenditures for crisis consumers and heavy

Table 6. Changes in Medicare Expenditures for All Clusters, 2000 to 2003

Years	Cluster	Expenditures		
		Initial Year	Following Year	Change (%)
2000-01	Crisis Consumers 2000	\$19,434,616,983	\$8,422,071,958	-57
	Heavy Consumers 2000	\$64,224,646,100	\$40,769,072,888	-37
	Moderate Consumers 2000	\$33,165,346,073	\$42,543,482,824	+28
	Light Consumers 2000	\$15,268,697,776	\$45,084,897,377	+195
	Low Consumers 2000	\$4,404,304,666	\$43,348,581,321	+884
	Total	\$136,497,611,599	\$180,168,106,368	+32
2001-02	Crisis Consumers 2001	\$21,563,405,221	\$9,235,571,971	-57
	Heavy Consumers 2001	\$71,934,481,752	\$44,828,834,063	-38
	Moderate Consumers 2001	\$38,030,078,784	\$46,740,999,830	+23
	Light Consumers 2001	\$18,040,230,837	\$48,860,147,632	+171
	Low Consumers 2001	\$5,348,362,372	\$47,191,722,120	+782
	Total	\$154,916,558,966	\$196,857,275,616	+27
2002-03	Crisis Consumers 2002	\$23,596,564,621	\$10,047,062,166	-57
	Heavy Consumers 2002	\$78,479,638,808	\$49,129,051,288	-37
	Moderate Consumers 2002	\$41,635,059,885	\$51,408,649,708	+23
	Light Consumers 2002	\$19,904,070,014	\$53,218,939,451	+167
	Low Consumers 2002	\$6,064,393,420	\$51,349,938,820	+747
	Total	\$169,679,726,749	\$215,153,641,432	+27

consumers. These patterns confirm that persistence can only partially explain the composition of these more costly clusters. In each of the two-year periods studied, expenditures for crisis consumers dropped 57% and expenditures for heavy consumers dropped about 37%.

The signal embedded in the low-, light-, and moderate-consumer clusters is that beneficiaries who are not receiving full benefits may drive costs substantially in Medicare. Consumption for 2000 low consumers, for example, rose by 884% in 2001. For 2001 low consumers, there was a 782% rise in 2002, and for 2002 low consumers, there was a 747% rise in costs in 2003. Although consumption did not rise as dramatically for light consumers, the average increase in expenditures for that cluster was about 178%. Collectively, by accounting for the decline in consumption for crisis and heavy consumers and the increase for moderate, light, and low consumers—not adjusting for inflation—Medicare spent 27% more on the same FFS population.

The same consumption patterns are evident for diabetics in the clusters. Using the methods described for Table 6, Table 7 compares expenditures for diabetics in a cluster during two-year periods from 2000 to 2004. Excluded are any beneficiaries who died in the first year or who lost coverage and/or enrolled in a Medicare Part C program during any of the study periods. As a consequence, 7% of year 2000 diabetics, 14% of year 2001 diabetics, and 15% of year 2002 diabetics are not included in the table.

The findings suggest that attention should be paid to diabetics whose consumption hints at underutilization of benefits. In the second year of each two-year period, there was a substantial drop in expenditures for crisis- and heavy-consumer diabetics, but a significant rise in expenditures for low-, light-, and moderate-consumer diabetics. Diabetics who were low consumers in 2000 had a 777% escalation in costs in 2001. The 2001 low consumers had a 650% rise in 2002, and the

Table 7. Changes in Medicare Expenditures for Diabetic Beneficiaries

Years	Cluster	Expenditures		
		Initial Year	Following Year	Change (%)
2000–01	Crisis Consumers 2000	\$5,751,469,357	\$2,803,592,102	-51
	Heavy Consumers 2000	\$15,874,062,692	\$11,188,193,357	-30
	Moderate Consumers 2000	\$7,138,683,794	\$10,019,687,134	+40
	Light Consumers 2000	\$2,828,695,565	\$9,398,814,595	+232
	Low Consumers 2000	\$597,117,902	\$5,239,490,741	+777
	Total	\$32,190,029,309	\$38,649,777,929	+20
2001–02	Crisis Consumers 2001	\$6,447,153,320	\$3,098,973,449	-52
	Heavy Consumers 2001	\$18,023,320,539	\$12,407,286,025	-31
	Moderate Consumers 2001	\$8,404,343,139	\$11,226,301,540	+34
	Light Consumers 2001	\$3,423,570,065	\$10,300,497,184	+201
	Low Consumers 2001	\$742,436,629	\$5,776,905,604	+678
	Total	\$37,040,823,693	\$42,809,963,802	+16
2002–03	Crisis Consumers 2002	\$7,256,340,794	\$3,454,635,901	-52
	Heavy Consumers 2002	\$20,178,597,134	\$13,973,002,274	-31
	Moderate Consumers 2002	\$9,485,433,870	\$12,693,147,684	+34
	Light Consumers 2002	\$3,893,159,833	\$11,552,563,319	+197
	Low Consumers 2002	\$872,567,991	\$6,541,402,594	+650
	Total	\$41,686,099,623	\$48,214,751,771	+16
2003–04	Crisis Consumers 2003	\$8,704,255,417	\$4,453,200,150	-49
	Heavy Consumers 2003	\$25,112,720,643	\$17,489,345,492	-30
	Moderate Consumers 2003	\$12,309,548,088	\$15,873,379,518	+29
	Light Consumers 2003	\$5,273,275,657	\$14,494,609,458	+175
	Low Consumers 2003	\$1,251,578,312	\$8,506,083,680	+580
	Total	\$52,651,378,117	\$60,816,618,299	+16

2002 low consumers had a 670% rise in 2003. In 2003 Medicare's average spending on low-consumer FFS diabetics (who represented two-thirds of all the diabetics in the program) averaged less than \$1,500 (see Table 1). These findings raise the important question of whether it is possible to manage diabetes on a yearly budget of \$1,500. If not, the 580% rise in costs for this cohort in 2004 should not have been unexpected. In 2004, in spite of the decline in consumption for crisis and heavy consumers, the increase in consumption for moderate-, light-, and low-consumer diabetics—not adjusting for inflation—resulted in Medicare's spending 16% more on the diabetics who persisted in the program from 2003.

Discussion and Conclusions

Earlier research has documented that a relatively small number of beneficiaries—on an annual basis and over time—consume most of the Medicare budget.⁴ This research may have conveyed the impression that it is quite literally the same individuals with persistent high medical cost who have a determinative impact on the Medicare budget. The analysis of Medicare beneficiaries' consumption patterns summarized in this Issue Brief found that only a small fraction of beneficiaries are persistent high consumers of Medicare benefits, and these individuals have a relatively small impact on the Medicare budget.

Particularly striking is a potential correlation between the amounts that Medicare reimbursed for the care of beneficiaries with chronic diseases in any given year and future costs. These findings have resource-management implications that warrant further investigation.

Medicare beneficiaries fall into discernible consumption patterns. Medical consumption patterns, like other consumer patterns, are not random. There is a consistency to them that may be understood and exploited to improve quality while bringing down cost. In reviewing these consumption patterns, there is ample evidence that in the immediate future, significant increases in reimbursements may be anticipated for those beneficiaries with diabetes who rank among the lowest consumers of benefits in a prior year. It is likely that similar patterns will be found for those with other chronic diseases.

The key findings in this study are as follows:

- Medicare beneficiaries may be clustered into five consumption groups (crisis consumers, heavy consumers, moderate consumers, light consumers, and low consumers), based upon how much

Medicare reimbursed for services provided them in any year. These are dynamic clusters, whose membership changes significantly from one year to the next.

- The two most-costly clusters are crisis consumers and heavy consumers. They represent only 11% of Medicare beneficiaries, but 65% of all costs.
- Each year, movement from the less-costly clusters (moderate consumers, light consumers, and low consumers) to the two most-costly clusters (crisis consumers and heavy consumers) drives cost increases in Medicare.
- Only a small percentage of crisis and heavy consumers are persistent high consumers, who continue to require expensive medical services the following year. Low-consumer diabetics are likely to cost Medicare significantly more in the near term.

Low-consumer diabetics are likely to cost Medicare significantly more in the near term.

- The rise in the cost for low-consuming diabetics not only offsets savings that might be achieved by the reductions in reimbursements for crisis and heavy consumers, but actually causes a total rise in cost for all diabetics from one year to the next.
- Future research is warranted to determine whether other values (age, race, gender, geography, clinical) may signal opportunities for intervention to reduce avoidable emergency and inpatient care.

There is a clear need to understand consumption patterns in Medicare. Questions that warrant further investigation include the following:

- How are beneficiaries—particularly those with chronic diseases—using the benefits?
- Can low consumption patterns be associated with undertreatment?
- What drives their consumption?
- Can planners use stability in consumption to anticipate utilization?

By understanding the consumption patterns of Medicare beneficiaries, we can build a 21st-century health-care system that is patient centered, proactive (built to anticipate risk and to reduce acute events through early interventions and improved chronic-care management), and capable of bringing a calculable return on investment. That is our future.

Endnotes

- ¹ Julie S. Krop, Christopher D. Saudek, Wendy E. Weller, Neil R. Powe, Thomas Shaffer, and Gerard F. Anderson, “Predicting Expenditures for Medicare Beneficiaries with Diabetes: A Prospective Cohort Study from 1994 to 1996,” *Diabetes Care* 22 (1999): 1660–66.
- ² Congressional Budget Office, *High-Cost Medicare Beneficiaries* (Washington, DC: Congressional Budget Office, 2005), p. iii.
- ³ *Chronic Condition Data Warehouse User Manual: Version 1.5* (Buccaneer Computer Systems & Services, Inc., May 2009), <http://www.ccwdata.org/downloads/CCW%20User%20Manual.pdf>, accessed 25 January 2010.
- ⁴ M. L. Berk, A. C. Monheit, and M. M. Hagan, “How the U.S. Spent Its Health Care Dollar: 1929–1980,” *Health Affairs* 7, no. 4 (1988): 46–60; M. L. Berk and A. C. Monheit, “The Concentration of Health Expenditures: An Update,” *Health Affairs* 11, no. 4 (1992): 145–149; M. L. Berk and A. C. Monheit, “The Concentration of Health Care Expenditures, Revisited,” *Health Affairs* 20, no. 2 (2001): 9–18; A. C. Monheit, “Persistence in Health Expenditures in the Short Run: Prevalence and Consequences,” *Medical Care* 41, no. 7, suppl. (2003): III53–III64; W. W. Yu and T. M. Ezzati-Rice, *Concentration of Health Care Expenditures in the U.S. Civilian Noninstitutionalized Population*, Statistical Brief no. 81 (Rockville, MD: Agency for Healthcare Research and Quality, 2005); S. B. Cohen and W. Yu, *The Persistence in the Level of Health Expenditures over Time: Estimates for the U.S. Population, 2002–2003*, Statistical Brief no. 124. (Rockville, MD: Agency for Healthcare Research and Quality, May 2006), <http://www.meps.ahrq.gov/papers/st124/stat124>.



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