
Medication Patterns for Medicare Beneficiaries with SNF/LTC Facility Stays

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Under the new Medicare drug benefit, beneficiaries residing in nursing homes and other long-term care (LTC) facilities have the same wide selection of Part D prescription drug plans available to community-dwelling beneficiaries. However, Part D does not alter Part A coverage for drugs during qualified skilled nursing facility (SNF) stays. This raises questions of whether drug utilization patterns differ for beneficiaries who transition between SNF episodes and other LTC facility stays and whether the presence of prescription coverage makes any difference. This study used regression analysis of the Medicare Current Beneficiary Survey (MCBS) data from 2001 to address these questions. We found that beneficiaries received between 7-30 percent fewer medication administrations during SNF months compared to months spent only in other LTC facility stays ($p < 0.01$). We found no evidence that prescription coverage influenced medication utilization patterns during non-Medicare qualified LTC facility stays.

INTRODUCTION

Under terms of the 2003 Medicare Prescription Drug, Improvement, Modernization Act, Medicare beneficiaries in LTC settings are eligible for the same prescription drug benefits as community-dwelling

beneficiaries.¹ Beneficiaries have always had prescription coverage during Medicare qualifying Part A SNF stays. The new Part D benefit offers beneficiaries an opportunity for prescription coverage during other LTC facility stays. The relationship between prescription coverage and medication use by nursing home residents has been evaluated in two recent articles focusing on prescription drugs (Stuart, Simoni-Wastila, and Baysac, 2007), and over-the-counter (OTC) medications (Simoni-Wastila, Shaffer, and Stuart, 2007). However, neither article evaluated medication use during Medicare-qualified SNF stays. Two policy briefs prepared by the authors for DHHS, Assistant Secretary for Planning and Evaluation present data on drug expenditures in nursing homes and other LTC facilities (Simoni-Wastila, Shaffer, and Stuart, 2006b, 2007), but the portion of costs incurred during Medicare-qualified SNF stays was not identified. This article helps fill an important gap in our understanding of medication patterns in LTC facilities by comparing use and spending for prescription and OTC drugs during SNF stays and other LTC facility stays.

The study has three aims: The first is to characterize Medicare-qualified SNF stays in relation to other episodes of long-term institutional care that beneficiaries may experience. The Medicare SNF benefit was originally conceived as an extension of hospitalization for individuals requiring

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¹ Nursing home residents eligible for low income subsidies under the 2003 Medicare Modernization Act are spared the copays required for beneficiaries in other settings.

skilled nursing services during a period of recuperation. Except for a brief period between the enactment and repeal of the 1988 Medicare Catastrophic Coverage Act, this benefit design prevails today. Routine LTC facility care is not a covered benefit and Medicare has no recordkeeping process for tracking non-SNF-related LTC episodes. Our analysis relating to this aim provides context for the next two study aims.

Our second aim is to learn more about patterns of medication use and spending during SNF stays. Since the SNF prospective payment system (PPS) was introduced in July 1998, SNFs have been paid on a case mix adjusted per diem basis that bundles nursing, therapy, and non-therapy services together (Liu et al., 1999; American Society of Consultant Pharmacists, 1999). Medication costs are defined as non-therapy ancillaries and are buried in the nursing component. Detailed information regarding medication use in SNFs is not available from the PPS cost reports, nor are medication statistics routinely collected as part of the minimum data set (MDS). SNF cost reports can be used to isolate pharmacy-related expenses. Costs of operating the pharmacy are included as general service costs, while drugs charged to patients are included as ancillary services costs (Decker and Bizette, 2004). In neither case is it possible to isolate individual drugs used exclusively by Medicare patients during Part A stays.

Section O of the MDS includes limited data on use of selected psychoactive medications. Section U of the MDS includes spaces for listing up to 21 medications used by residents in the week prior to the MDS review (Centers for Medicare & Medicaid Services, 2002). However, Section U is not a mandated field and drug data from this field are only available for six demonstration States in the early and

mid-1990s. In fact, to our knowledge, there are no current published national statistics on medication use during Part A SNF stays.

Our third aim is to compare drug use and spending during SNF and other LTC facility stays for Medicare beneficiaries who experience both types of episodes. The rationale for this analysis is twofold. First, LTC facilities face different financial incentives depending on which payer is responsible for drug costs. During SNF stays, the nursing facility is at risk for all medication expenses. For patients remaining in the facility after SNF discharge, drug costs are almost always passed through to other payers.² The home bears residual risk for uninsured residents who cannot afford necessary medications, but for the most part, financial risk is transferred to third parties (now primarily Medicare Part D plans). The question for policymakers is whether risk bearing has any influence over the way that medications are managed during SNF stays.

Another reason for examining transitions between SNF and other LTC facility stays is that beneficiaries are automatically covered for all drug expenses during Medicare-qualified SNF episodes, but may or may not be covered for drug expenses for other stays. The question here is whether lack of drug benefits reduces medication use during non-qualified stays. The advent of the new Part D benefit increases the opportunities for LTC residents to obtain drug coverage. The analysis relating to this question provides benchmark data against which policymakers can compare post-Part D experience when Medicare drug claims become available to the research community.

² The exception would be for beneficiaries enrolled in integrated health plans that have their own nursing facilities.

METHODS

Data Source

Data for this study were drawn from the 2001 MCBS. Information on SNF stays was derived from Medicare Part A claims. Data on other LTC residential stays were obtained from the MCBS residence time line (Ric 9 in the MCBS Files). The residence time line tracks up to 20 residential transitions between community, SNF, and other institutional settings during the year and flags admission and discharge dates for each episode by facility type. MCBS defines institutional facilities as domiciles that meet the following formal criteria: (1) contain three or more beds, (2) are classified by the administrator as providing LTC, and (3) whose physical structure allows LTC residents of the facility to be separately identified from those of the institution as a whole (Centers for Medicare & Medicaid Services, 2001). This would appear to be an expansive definition of LTC facilities. However, in practice, only facilities that provide 24-hour skilled nursing services and centralized medication administration are included in the MCBS facility files.³ That still encompasses a wide assortment of institutions ranging from traditional skilled nursing homes to hospital distinct-part SNFs, rehabilitation hospitals, long-term psychiatric institutions, and high-end assisted living facilities, among others.

The MCBS considers Medicare qualified SNF stays to be facility stays only if they represent part of an extended stay (i.e., the beneficiary is not expected to be released to the community). This distinction has important practical consequences for analysts because MCBS information

capture for institutionalized beneficiaries is markedly different than in the community. In the community setting, all survey information is obtained directly from the sampled person (or designated proxy) using computer-assisted personal interviews. If the sample person is a facility resident, all survey information is obtained from facility staff and administrative records made available to MCBS interviewers—facility residents are not directly interviewed.

Prescription drug data for this article were taken from the MCBS Institutional Drug Administration (IDA) Files created by the University of Maryland Baltimore under contract with CMS and Westat. The IDA Files are extracted from LTC facility medication administration records (MAR) and include month-by-month tabulations of all medications (both prescription-only and OTC drugs) listed on the MAR together with drug strength and dosing information (scheduled as well as on a prn or as needed basis). In addition, the IDA indicates the number of total administrations recorded for each drug mention each month. By contrast, drug event-level data collected on the community side of the MCBS are based on self reports and are aggregated at the year level with no service dates. It is therefore impossible to date prescription medication events (PMEs) for MCBS beneficiaries who have no LTC facility exposure. Because stand-alone SNF stays are not considered facility stays, we are unable to provide medication utilization and cost statistics for this segment of SNF stays.

Study Sample

The study sample comprised all MCBS respondents in 2001 with evidence of any SNF stay irrespective of MCBS facility status. Altogether, 589 individuals met this criterion. We then identified subsets of

³ Facilities with centralized medication administration systems rarely permit residents to obtain medications through other routes. This means that drug utilization measures reported in this article have a high degree of reliability.

beneficiaries with and without other LTC episodes in conjunction with the SNF stay. The subsample with no additional LTC episodes represented 308 respondents. The remaining 281 beneficiaries had evidence of other LTC facility stays either directly before or after a SNF episode. There were a total of 6,368 person-month observations in the two groups—3,517 in the subsample with SNF and no other LTC stays and 2,861 in the subsample with SNF and other LTC episodes.

Measures

We measure medication utilization in two ways, (1) as mean counts of unique drugs administered per person month (ppm) and (2) mean number of administrations ppm. Both measures are computed for prescription-only medications, OTC products, and all drugs combined.⁴ Medication expenditures are also captured ppm, but are limited to prescription-only drugs.⁵ The drug utilization and expenditures statistics are profiled by beneficiary residential status reflecting six mutually exclusive scenarios: (1) SNF-only (all days in the month were part of a SNF-qualified stay), (2) community plus SNF (the beneficiary either entered a SNF stay from the community and/or was discharged to the community from a SNF stay), (3) SNF plus other LTC facility (where facility is defined as any MCBS institutional facility), (4) SNF plus other LTC facility plus community, (5) other LTC facility-only, and (6) other LTC facility plus community. These categories do not reflect order of transition or number of distinct SNF or other LTC facility placements per month. The six groups were honed down from a

⁴ By regulation, all medications administered to nursing home residents must be prescribed regardless of their status as prescription-only or OTC drugs.

⁵ The CMS algorithm used to price drug products specifically excludes OTC products (Simoni-Wastila et al., 2006b).

total of 43 unique combinations of ordered transitions (e.g., community to SNF and SNF to community), and other LTC facility placements (e.g., a transfer from one to another LTC facility) discovered during preliminary analyses.⁶

One feature of the residential situation scenarios is that they differ systematically in the number of days per month in which beneficiaries may receive medications through SNF and/or other LTC facility providers. For example, we observe drug use for the entire month for beneficiaries with a SNF-only or another LTC facility-only month, whereas a community plus SNF month includes community and acute care hospital days in which drug use is not observed. In order to provide standardized denominators for LTC medication use, we created a variable denoted as “potential LTC therapy days,” which is operationally defined as the number of days in a given month minus days spent in the community, in an inpatient hospital stay, and for decedents, the number of days from the date of death to the end of the month. The MCBS resident timeline does not consider acute care hospital episodes. To avoid artificially inflating facility days for resident situations involving an acute hospital stay, it was necessary to subtract hospital days using information on inpatient admission and discharge dates from Medicare Part A claims.

Additional study variables used to characterize the study population included age, sex, race, marital status, educational attainment, income in relation to the Federal poverty level, geographic residence, and the presence and source of prescription drug coverage. The MCBS Cost and Use Files contain detailed plan-level information about prescription coverage for community-

⁶ The most common patterns were single residential placements and those with a single transition. However, we found 57 monthly observations with four or more placements.

dwelling Medicare beneficiaries. However, there are no specific questions about drug coverage for institutionalized beneficiaries. In some cases, we could infer that LTC facility residents had drug coverage based on Medicaid enrollment records. All traditional Medicaid Programs offer prescription coverage to LTC residents. In addition, beneficiaries who are qualified Medicare beneficiaries (QMB) or specified low income beneficiaries (SLMB) may have prescription coverage at the State's discretion (these are known as QMB-plus and SLMB-plus States). Beneficiaries who enroll in a State pharmaceutical assistance program also have drug coverage. For a select subsample of LTC residents we could track private health insurance and prescription benefits prior to LTC admission. In such cases, we deemed residents who had prior drug coverage to have it while institutionalized. Finally, we could determine whether LTC residents had any source of Medicare supplementation. Those with no Medicare supplementation are without prescription coverage by definition. As a result of these investigations, we defined four classes of prescription coverage: Medicaid with prescription benefits, other source of prescription coverage, prescription coverage status unknown (comprising those with a private Medicare supplement whose prescription coverage status could not be determined), and those with no prescription coverage (including QMBs and SLMBs in non-plus States).

We used *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)* codes (Centers for Disease Control and Prevention, 2007) from Medicare claims to compute a global measure of resident disease burden—the count of medication-sensitive conditions derived from the CMS prescription drug hierarchical condition category (RxHCC)

risk-adjustment model. The RxHCC is derived using the same hierarchical co-existing condition methodology as its parent, the DCG/HCC model (Pope et al., 2004). The condition clusters are defined to be both clinically meaningful and statistically predictive of drug spending. When increasing severity of disease leads to more intense drug therapy, the model captures only the highest cost category for that disease and overrides lower cost categories. The 2006 version of the model includes 196 condition clusters. We used this version to count medication-intensive condition for each beneficiary in the study sample.

Statistical Analysis

Descriptive findings are presented in two tables with statistics for all Medicare beneficiaries who have SNF stays and for the two subpopulations that either have SNF-only stays or SNF plus other LTC facility stays. Table 1 presents population characteristics at the person level. Table 2 presents frequencies of residential combinations at the ppm level. Unadjusted results are summarized in Table 3 showing mean ppm drug utilization and cost statistics by residential situation. All descriptive statistics are weighted to be nationally representative of the Medicare population with standard errors adjusted for repeated measures and the complex sampling design of the MCBS using the robust command in Stata 9.

We employed regression analysis with the resident-month as the unit of analysis to determine if there are significant differences in medication utilization and spending levels by residential situation status controlling for possible confounding factors. Seven regressions were estimated with ppm drug measures as the dependent variables (counts of prescription drugs,

Table 1
Characteristics of Medicare Beneficiaries with Skilled Nursing Facility (SNF) Stays, by Long-Term Care (LTC) Facility Residential Status: 2001

Characteristic	Total Medicare Beneficiaries With SNF Stay ¹	Beneficiaries With SNF Stays and No Other LTC Facility Stay ^{1,2}	Beneficiaries With SNF Stays and Some Other LTC Stay ^{1,3,4,5}
Beneficiaries (Sample)	589	308	281
Beneficiaries (Nationally Weighted)	1,617,606	916,481	701,124
SNF			
Mean Number of Stays	1.4 (0.04)	1.3 (0.04)	1.6 (0.06)
Mean Number of Days	30.1 (1.21)	20.6 (1.18)	42.6 (2.04)
Mean Reimbursement	\$8,179 (323.2)	\$6,244 (375.2)	\$10,734 (512.9)
Age			
		Percent	
Under 65 Years ⁶	5.5	5.6	5.3
65-74 Years	20.3	25.6	13.4
75-84 Years	43.4	48.3	37.0
85 Years or Over	30.8	20.5	44.3
Sex			
Male	33.6	37.5	28.5
Female	66.4	62.5	71.5
Race			
White	90.1	92.1	87.6
Non-White	9.9	7.9	12.4
Marital Status			
Married	27.0	32.7	19.6
Widowed	55.6	52.2	59.9
Never Married/Divorced/Separated	17.4	15.1	20.5
Education			
Less Than High School Graduate	45.4	39.0	53.8
High School Graduate	26.5	29.2	23.0
Some Post High School Education	28.1	31.8	23.2
Geographic Region			
East	25.0	24.9	25.1
Midwest	27.7	29.5	25.4
South	30.8	28.5	33.9
West	16.5	17.1	15.6
Income in Relation to Federal Poverty Level			
< 100%	21.1	12.4	32.4
100-199%	40.0	42.6	36.7
200-300%	18.3	21.8	13.6
> 300%	20.6	23.2	17.3
Prescription Coverage			
Medicaid	26.6	13.4	43.8
Other	41.5	58.0	19.9
Coverage Unknown	6.8	0.6	14.9
No Coverage	25.1	28.0	21.4
Mean Number RxHCCs	11.0 (0.2)	10.6 (0.3)	11.5 (0.3)
Died	23.9	14.0	36.8

¹ Weighted to be nationally representative.

² Defined as beneficiaries who have SNF stays and no other recorded residence in an LTC facility.

³ Drugs paid for entirely through Part A per diem.

⁴ Defined as beneficiaries with SNF stays and one or more recorded stays in an LTC facility.

⁵ Drugs paid for under Part A and from other sources.

⁶ Social Security Disability Insurance.

NOTES: Standard errors are shown in parentheses. RxHCC is prescription drug hierarchical condition category.

SOURCE: Centers for Medicare & Medicaid Services: Data from the Medicare Current Beneficiary Survey, 2001.

Table 2
Characteristics of Residential Situations for Medicare Beneficiaries With Skilled Nursing Facility (SNF) Stays With or Without Other Long-Term Care (LTC) Facility Stays: 2001

Residential Situation	Medicare Beneficiaries With SNF Stay ¹	Beneficiaries With SNF Stays and No Other LTC Facility Residential Stay ^{1,2,3}	Beneficiaries With SNF Stays and Some Other LTC Facility Residential Stay ^{1,2,3,4,5}
		Percent	
Community Only	57.4	84.7	17.3
Community Plus SNF	9.7	13.9	3.6
Community Plus SNF Plus Other LTC Facility	0.6	NA	1.4
SNF Only	3.6	1.4	6.8
SNF Plus Other LTC Facility	6.1	NA	15.0
Other LTC Facility Only	22.1	NA	54.4
Other LTC Facility Plus Community	0.5	NA	1.2
Total ⁶	100.0	100.0	100.0

¹ Weighted to be nationally representative.

² Defined as beneficiaries who have SNF stays and no other recorded residence in an LTC facility.

³ Drugs paid for entirely through Part A per diem.

⁴ Defined as beneficiaries with SNF stays and one or more recorded stays in an LTC facility.

⁵ Drugs paid for under Part A and from other sources.

⁶ May not equal exactly 100 percent because of rounding.

NOTE: NA is not applicable.

SOURCE: Centers for Medicare & Medicaid Services: Data from the Medicare Current Beneficiary Survey, 2001.

OTCs, and all drugs; administrations for prescription drugs, OTC, and all drugs; and expenditures for prescription drugs only). The primary explanatory variables are five residential situation status categories with “other LTC facility-only days” as the reference group. Covariates included all the variables shown in Table 1 plus the potential LTC therapy days variable that standardizes each person-month observation for LTC medication eligible days.

The fact that all study subjects had some exposure to both SNF and other LTC facility stays represents a natural experiment that we analytically exploited to determine whether facility financial incentives and/or beneficiary drug coverage influenced medication patterns. The hypothesis is that bearing risk for medication costs leads to reduced medication use during SNF stays was tested by comparing regression-adjusted utilization rates among beneficiaries who had drug coverage in months with SNF-only days and other LTC facility-only days. The hypothesis

that beneficiaries with no drug coverage experience lower utilization rates during non-qualified LTC months was tested in a similar fashion by comparing adjusted utilization rates among beneficiaries with no drug coverage in months with SNF-only days and other LTC facility-only days. All regression models were estimated using ordinary least squares with the robust command in Stata 9.

RESULTS

In 2001, more than 1.6 million Medicare beneficiaries had one or more qualified SNF stays (Table 1). However, of these individuals, approximately 43 percent had evidence of another LTC facility stay and 57 percent did not have evidence. The characteristics of the two subgroups differ substantially. Those with other LTC facility stays had 23 percent more SNF episodes on average (1.6 versus 1.3), more than double the total number of annual SNF days (42.6 versus 20.6), and 72 percent higher

Table 3
Medication Utilization and Expenditures for Medicare Beneficiaries with Skilled Nursing Facility (SNF) and Other Long-Term Care (LTC) Facility Stays: 2001

Medication Measures Per Patient Month	Months With Only SNF Days ^{1,2}		Months With SNF and Other LTC Facility Days ^{1,3}		Months With Only Other LTC Facility Days ^{1,4}	
Number of Months With Residential Situation	195		433		1,610	
Mean Potential LTC Therapy Days Per Month ⁵	30.2	(0.1)*	24.2	(0.3)**	29.3	(0.1)
Months With Medication Use	94.4		91.5		94.3	
Mean Number of Unique Medications						
OTC	2.9	(0.2)	2.7	(0.1)	2.8	(0.1)
Prescription-Only	6.3	(0.3)	6.7	(0.2)*	6.3	(0.1)
Total	9.2	(0.4)	9.4	(0.3)	9.1	(0.1)
Mean Number of Drug Administrations						
OTC	99.5	(7.1)	79.4	(4.3)**	109.4	(2.5)
Prescription-Only	237.3	(12.0)	195.7	(7.2)**	248.8	(4.0)
Total	336.8	(15.4)	275.1	(9.9)**	358.3	(5.4)
Mean Monthly Expense for Prescription-Only Drugs	\$264.00	(15.8)	\$224.00	(11.3)*	\$246.00	(5.2)
Mean Expense Per Prescription	\$41.42	(1.49)	\$33.43	(1.33)**	\$40.24	(0.69)

* Significantly different at $p < 0.05$ from other LTC facility-only value.

** Significantly different at $p < 0.01$ from other LTC facility-only value.

¹ Weighted to be nationally representative.

² Drugs paid for entirely through Part A per diem.

³ Drugs paid for under Part A and from other sources.

⁴ Drugs paid for entirely from other sources.

⁵ The mean month contains 30.4 days.

NOTES: Standard errors are shown in parentheses. OTC is over-the-counter.

SOURCE: Centers for Medicare & Medicaid Services: Data from the Medicare Current Beneficiary Survey, 2001.

Medicare SNF reimbursement (\$10,734 versus \$6,244). Given the tight standard errors around these estimates, the differences are all statistically significant.

There are equally large differences in personal characteristics between the two groups. Beneficiaries with SNF plus other LTC facility stays are much older on average (44.3 percent age 85 or over compared to 20.5 percent for beneficiaries with only SNF episodes), much less likely to be married (19.6 percent versus 32.7 percent), and have much lower levels of socioeconomic status. Over one-half (53.8 percent) of beneficiaries with SNF and other LTC facility stays failed to graduate high school compared to 39 percent for those with SNF-only stays. Income differences are even more dramatic, with almost one-third (32.4 percent) of beneficiaries with both SNF

and other LTC facility stays falling below the Federal poverty level compared to just 12.4 percent for those with SNF stays alone. Medicaid represented the primary source of prescription coverage for beneficiaries with SNF and other LTC facility stays (43.8 percent). A majority (58.0 percent) of beneficiaries with only SNF stays obtained prescription coverage from other sources (primarily from employer sponsored health insurance plans). Medicaid (13.4 percent) was a relatively unimportant source of coverage for these individuals.

There also are differences in disease burden and mortality rates between the two groups of SNF recipients. On average, beneficiaries with only a SNF stay recorded 10.6 medication-intensive conditions based on the RxHCC risk-adjustment model compared to 11.5 conditions for those

with other LTC facility episodes. Annual mortality was dramatically higher in the SNF plus other LTC facility group (36.8 percent) compared to the SNF-only group (14.0 percent).

Table 2 provides a breakdown of residential situations for the study sample and subpopulations with and without other LTC facility stays. The table shows the percent of months beneficiaries spent in various combinations of residential situations involving the community, SNF, and other LTC facilities. Situations involving more than one status imply residential transfers.⁷ We tallied the direction and number of such transfers on a monthly basis, but given the large number of combinations (43 in total) and small cell sizes, these are not enumerated in Table 2.

The percentage distributions shown in Table 2 are computed on the basis of the number of months each beneficiary was a SNF and/or other LTC facility resident during the study year. Because of higher death rates in the SNF plus other LTC facility sample, the average number of months of observation (10.1 months) is lower than in the sample with SNF stays only (11.4 months). As expected, the subpopulations have very different distributions of residential status, beginning with the percentage of months spent in the community (17.3 percent for the population with SNF and other LTC stays compared to 84.7 percent for the group without other LTC facility stays). The SNF-only sample has zero other LTC facility days by definition; those in the other LTC facility sample spent an average of 56.6 percent of months in such stays. The distribution of SNF days across the year varies as well. For the SNF-only group, just 1.4 percent of months were

spent wholly in a SNF stay compared to 6.8 percent in the SNF plus other LTC facility group. For the SNF-only group 15.1 percent of months included both SNF and community days. Although not shown in the table, the distribution is almost evenly split between community to SNF transfers (35 percent), SNF to community transfers (31 percent), and community to SNF back to community transfers (30 percent), with 4 percent having more complex residential situations. Each of these transfers involved an intervening acute hospitalization. Beneficiaries with SNF and other LTC facility stays had a higher proportion of months with complex residential situations: 20 percent of all months involved SNF days in combination with community and/or other LTC facility days. Sixty-two percent of all transfers recorded by month were other LTC facility to SNF, SNF to other LTC facility, or other LTC facility to SNF back to other LTC facility (each with an intervening hospitalization). However, up to six transfers were recorded in a single month for several residents in this sample.

Table 3 presents statistics on medication use and spending for the subsample of beneficiaries with SNF and/or other LTC facility stays. The three residential situations represented in this table (SNF-only, SNF plus other LTC facility, and other LTC facility-only) comprise 76 percent of the observation periods for these beneficiaries during 2001. By definition, there is no IDA drug capture during the 17.3 percent of months beneficiaries spent in the community. The sample sizes in the remaining three residential situations (community plus SNF, community plus SNF plus other LTC facility, and other LTC facility plus community) are too small for stable drug utilization estimates and thus, are excluded from the remaining analyses.

⁷ A SNF-to-other LTC facility transfer may or may not result in a physical transfer; frequently, the resident remains in the same facility and only the payment status changes.

Medications are administered in a very high proportion of all resident months, ranging from 91.5 percent in SNF plus other LTC facility months to 94.4 percent in SNF-only months. The number of unique drugs administered also is similar, ranging from 9.1 to 9.4 medications ppm, with about 70 percent representing prescription drugs and the remainder OTC products in each of the three residential situations.

There is more variation in numbers of ppm administrations for prescription and OTC medications. Mean monthly medication administrations are significantly lower in months with SNF plus other LTC facility days compared to other LTC facility-only days for OTC and prescription drugs. Medication administration rates for months with only SNF days are also slightly lower than months with only other LTC facility days, but the differences are not statistically significant. Similar relationships are evident in the statistics for average monthly prescription drug expense and mean expense per prescription. In both cases, the only significant differences are between months with SNF and other LTC facility days and months with only other LTC facility days, the latter being more costly on each measure.

Principal findings from the seven regression models are summarized in Table 4 (full model results are available on request from the authors). Comparing the actual utilization and spending values in Table 3 with the conditional predicted values in Table 4 indicates that controlling for other factors, including drug coverage and potential LTC therapy days, has a relatively small impact on measured differences in drug use by residential situation. All of the significant differences in the bivariate analyses shown in Table 3 are significant, but in the conditional model, we also find that medication administrations ppm for both prescription and OTC medications

are significantly lower ($p < 0.01$) for months with SNF-only stays compared to months with only other LTC facility days.

The coefficients on the prescription coverage variables in these models (results not shown) present a mixed picture. Contrary to expectations, the main effect of prescription coverage was consistently negative in the utilization equations, suggesting that coverage reduces rather than increases drug use. However, the signs shift to positive in the drug cost equation and are insignificant for Medicaid and other sources of drug benefits. The interactions of drug coverage and residential situation were insignificant in all models, indicating that prescription coverage has no substantive impact on aggregate medication utilization and spending patterns in transitions between SNF episodes and other LTC facility stays.

DISCUSSION

These findings present a mixed picture of the impact of facility risk bearing and resident insurance coverage on medication use during SNF and other LTC facility stays. On the one hand, the utilization results are consistent with the hypothesis that bundling drug costs within the Part A per diem for SNF stays may significantly lower utilization of both prescription drug and OTC medications. Other things being equal, we find that Medicare beneficiaries received between 7-30 percent fewer medication administrations during months with SNF days compared to months with only other LTC facility days ($p < 0.01$). Furthermore these large differences are based on highly credible data (the MCBS institutional drug administration data are direct extracts from nursing facility medication administration records).

Our findings regarding differences in prescription drug spending by residential

Table 4
Predicted Values for Medication Utilization and Expenditures for Medicare Beneficiaries, by Skilled Nursing Facility (SNF) and Other Long-Term Care (LTC) Facility Residential Situation¹

Variable	Model Fit (R^2)	Months With Only SNF Days ²	Months With SNF and Other LTC Facility ³	Months With Only Other LTC Facility Days ⁴
Mean Number of Unique Medications				
OTC	0.089	3.0 (0.02)*	2.7 (0.03)**	2.9 (0.04)
Prescription-Only	0.232	6.2 (0.14)	6.6 (0.09)**	6.3 (0.04)
Total	0.194	9.2 (0.16)	9.4 (0.10)*	9.1 (0.16)
Mean Number of Drug Administrations				
OTC	0.115	102.3 (1.84)**	81.6 (1.77)**	112.2 (0.78)
Prescription-Only	0.240	235.1 (5.19)**	195.7 (4.12)**	249.3 (1.81)
Total	0.236	337.4 (6.31)**	277.3 (5.59)**	361.5 (2.43)
Mean Monthly Expense for Prescription-Only Drugs	0.187	\$255.7 (6.79)	\$222.6 (4.78)**	\$245.0 (2.12)

* Significantly different at $p < 0.05$ from other LTC facility-only value.

** Significantly different at $p < 0.01$ from the other LTC facility-only value.

¹ Predicted values based on regressions controlling for age, sex, race, marital status, education, geographic region, income, prescription coverage, RxHCC condition counts, potential therapy days and death.

² Drugs paid for entirely through Part A per diem.

³ Drugs paid for under Part A and from other sources.

⁴ Drugs paid for entirely from other sources.

NOTES: Standard errors are shown in parentheses. OTC is over-the-counter. Full regression results are available on request from the authors.

SOURCE: Centers for Medicare & Medicaid Services: Data from the Medicare Current Beneficiary Survey, 2001.

setting are less robust. We found no significant difference between monthly prescription costs in SNF-only and other LTC facility-only months, but did find that mean drug spending was 10 percent lower ($p < 0.01$) in months with both SNF and other LTC facility days. The smaller SNF-related effects in drug expenses may be an artifact of the way that prescription drug prices are imputed in the MCBS IDA files. The IDA drug price figures are derived using industry-wide average wholesale price information with discounts based on payer source. However, SNFs are not considered to be payers in the CMS pricing algorithm used in these imputations, and thus any price discounts received by SNFs are not accounted for. This means that we probably underestimate the true difference in drug expenses for beneficiaries in SNF stays compared to other LTC facility stays. Had we more precise cost data, the prescription expense results would likely be similar to the utilization results.

We find no evidence that the lack of prescription coverage is an impediment to medication use during other LTC facility stays when drug expenses must be paid for either by residents themselves or their insurers. This finding is consistent with our previous work (Stuart, Simoni-Wastila, and Baysac, 2006; Simoni-Wastila, Shaffer, and Stuart, 2006a), but leaves unanswered the larger question of why medication utilization patterns are insensitive to insurance coverage yet quite sensitive to whether the LTC stay involves SNF days or not. One possibility is that our models fail to completely control for differences in patient acuity between the two types of stays. The RxHCC risk adjuster we used in these regressions offers strong control for potential confounding due to comorbidities (as evidenced in part by relatively high R^2 values in the prescription drug equations noted in Table 4), but we obviously cannot completely rule out residual confounding. That said, the potential bias associated with

our procedures is toward the null; better control for resident acuity should increase rather than decrease the measured differences in utilization rates between stays with SNF days and no SNF days.

The results presented in this article must be viewed in light of other important limitations. First, is the fact that the results can only be generalized to SNF episodes in conjunction with LTC facility stays. The detailed prescription drug and OTC utilization data in the IDA files are only available for residents of LTC facilities, and the MCBS does not consider a SNF stay to be a facility stay per se. For this reason we could not profile drug utilization patterns in stand-alone SNF stays. Second, is the small sample size. The 2001 MCBS surveyed 1,222 beneficiaries with some LTC exposure, but only 281 of these individuals met the inclusion criterion of having at least one Medicare qualified SNF episode. This was a sufficiently large group to permit analyses of aggregate drug utilization and spending patterns at the person-month level, but could not support detailed examination of drug use by disease state and therapeutic class. Third, the data are relatively old, reflecting the time and careful conditioning that the annual IDA files must go through before they are research ready.

These limitations notwithstanding, the study results have important policy relevance. They provide the first nationally representative statistics comparing medication utilization and cost patterns in SNF episodes and other LTC facility stays. As such, they can be used to benchmark post-Part D experience when the Medicare drug claims become available to the research community. Based on our finding that beneficiaries with and without prescription coverage had similar medication patterns during other LTC facility stays, we would be surprised if the new drug benefit has a

major impact on medication management over the transition between SNF episodes and other LTC facility stays.

Nothing in the MMA changes the way that nursing facilities are paid for medications administered during SNF stays. Our finding that drug utilization rates were significantly lower in months involving a SNF stay compared other LTC facility stays also warrants policymakers' attention. One interpretation of these results is that SNFs respond to the economic incentives of fixed per diem payments by cutting back on resident medication use. Additional research is needed to determine if this is true, and if so what the implications are for resident health and safety.

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