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Office of Disability, Aging and Long-Term Care Policy



DRUG USE AND SPENDING FOR MEDICARE BENEFICIARIES DURING PART A QUALIFYING SKILLED NURSING FACILITY STAYS AND NON-QUALIFYING LONG-TERM CARE FACILITY STAYS

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Office of the Assistant Secretary for Planning and Evaluation

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INTRODUCTION

Under the terms of the Medicare Prescription Drug, Improvement, and Modernization Act of 2005 (MMA), Medicare beneficiaries in long-term care facility (LTCF) 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 skilled nursing facility (SNF) stays. The new Part D benefit offers beneficiaries an opportunity for prescription coverage during non-qualifying LTCF stays. The relationship between prescription coverage and drug use by nursing home (NH) residents has been evaluated in two recent articles focusing on legend drugs (Stuart et al., 2006) and over-the-counter (OTC) medications (Simoni-Wastila, 2006a). However, neither article evaluated medication use during Medicare-qualified SNF stays. Two other Office of the Assistant Secretary for Planning and Evaluation Policy Briefs by the authors present data on drug expenditures in NHs and other LTCFs (Simoni-Wastila et al., 2006b, 2007), but the portion of costs incurred during Medicare-qualified SNF stays was not identified. This Policy Brief helps fill an important gap in our understanding of medication patterns in LTCF by comparing use and spending for prescription and OTC drugs during SNF stays and related non-qualifying LTCF episodes.

This Policy Brief has three aims. The first aim 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 skilled nursing services during a period of recuperation. Except for a brief period between the enactment and repeal of the Medicare Catastrophic Coverage Act of 1988, this benefit design prevails today. “Routine” LTCF care is not a covered benefit and Medicare has no record keeping process for tracking non-SNF-related LTCF episodes. Our analysis relating to this aim provides context for the next two study aims.

The 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; ASCP, 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,² nor are medication statistics routinely collected as part of

¹ NH residents eligible for low income subsidies under the MMA are spared the copays required for beneficiaries in other settings.

² The 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.

the Minimum Data Set (MDS).³ In fact, to our knowledge, there are no current published national statistics on medication use during Part A SNF stays.

The third aim of this Policy Brief is to compare drug use and spending during SNF and non-qualified LTCF stays for Medicare beneficiaries who experience both types of episodes. The rationale for this analysis is two-fold. First, LTCFs face very different financial incentives depending on which payor 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 payors.⁴ Thus, 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 policy-makers is whether risk bearing has any influence over the way that medications are managed during SNF stays.

The second reason for examining transitions between SNF and non-qualified LTCF 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 LTCF residents to obtain drug coverage. The analysis relating to this question will provide benchmark data against which policy-makers can compare post-Part D experience when Medicare drug claims become available to the research community.

METHODS

Data source. Data for this study were drawn from the 2001 Medicare Current Beneficiary Survey (MCBS). Information on SNF stays was derived from Medicare Part A claims. Data on other LTCF 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 long-term care, and (3) whose physical structure allows long-term care residents of the facility to be separately identified from those of the institution as a whole (MCBS, 2001). This would appear to be a very expansive definition of LTCFs. However, in practice, only facilities that provide 24 hour skilled nursing services and centralized medication

³ 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 (CMS, 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.

⁴ The exception would be for beneficiaries enrolled in integrated health plans that have their own nursing facilities.

administration are included in the MCBS facility files.⁵ That still encompasses a wide assortment of institutions ranging from traditional skilled NHs to hospital distinct part SNFs, intermediate care facilities for the mentally retarded, rehabilitation hospitals, long-term psychiatric institutions, and certain assisted living facilities, among others.

The MCBS considers Medicare-qualified SNF stays to be “facility” stays only if they represent part of an extended non-SNF-qualified facility stay (e.g., a post-hospital SNF episode for a NH resident). 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 Policy Brief were taken from the MCBS Institutional Drug Administration (IDA) files created by the University of Maryland Baltimore under contract with the Centers for Medicare and Medicaid Services (CMS) and Westat. The IDA files are extracted from LTCF medication administration records (MAR) and include month-by-month tabulations of all medications (both legend 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 file 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 for MCBS beneficiaries who have no LTCF 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. For aim 1, the study sample comprised all MCBS respondents in 2001 with evidence of any SNF stay irrespective of “facility” status. Five hundred and eighty-nine individuals met this criterion. For aims 2 and 3, we identified subsets of beneficiaries with and without other LTCF episodes in conjunction with the SNF stay. The sub-sample with no additional LTCF episodes represented 308 respondents. The remaining 281 beneficiaries had evidence of another LTCF stay 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 sub-sample with SNF and no additional LTCF stays and 2,861 in the sub-sample with SNF and other LTCF episodes. Our analysis of medication utilization and spending patterns is restricted to this latter group.

⁵ Facilities with centralized medication administration systems rarely if ever permit residents to obtain medications through other routes. The fact that the entire study population resides in facilities that have these systems in place means that the drug utilization measures reported in this Policy Brief have a high degree of reliability.

Measures. We measure medication utilization in two ways, as mean counts of unique drugs administered per person-month (PPM) and mean number of administrations PPM. Both measures are computed for prescription-only legend medications, OTC products, and all drugs combined.⁶ Medication expenditures are also captured PPM but are limited to legend drugs.⁷ 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 + SNF (the beneficiary either entered a SNF stay from the community and/or was discharged to the community from a SNF stay), (3) SNF + facility (where facility is defined as any MCBS “institutional facility”), (4) SNF + facility + community, (5) facility-only, (6) and facility + community. These categories do not reflect order of transition or number of distinct SNF or facility placements per month. The six groups were honed down from a total of 43 unique combinations of ordered transitions (e.g., community-to-SNF and SNF-to-community) and different LTCF placements (e.g., a transfer from one to another LTCF) discovered during preliminary analyses.⁸

One feature of the residential situation scenarios is that they differ systematically in the number of days per month in which beneficiaries are eligible to receive medications from the SNF and/or facility provider. For example, a facility-only month would include medication-eligible days for the entire month the resident was alive, whereas a community + SNF month includes community and acute care hospital days in addition to LTCF medication-eligible days. In order to provide standardized denominators for LTCF medication use, we created a variable denoted as “potential LTCF 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.⁹

Additional study variables used to characterize the study population included age, gender, race, marital status, educational attainment, income in relation to the Federal Poverty Level (FPL), geographic residence, and the presence and source of

⁶ By regulation, all medications administered to NH residents must be prescribed whether legend or OTC.

⁷ The MCBS algorithm used to price drug products specifically excludes OTC products (Simoni-Wastila, et al., 2006b).

⁸ The most common PPM patterns were single residential placements and those with a single transition. However, we found 57 monthly observations with four or more placements.

⁹ The MCBS resident timeline does not consider acute care hospital episodes. For beneficiaries entering a SNF stay from the community, the qualifying acute hospital days preceding the SNF admission are considered “community days.” For MCBS respondents in an LTCF episode, acute care hospital days are not differentiated from other facility days (i.e., according to the timeline, the “facility” episode in a “facility + SNF” month ends the day before the SNF episode begins). To avoid artificially inflating facility days for these resident situations, it was necessary to subtract acute care hospital days using information on inpatient admission and discharge dates from Medicare Part A claims.

prescription coverage.¹⁰ We used ICD-9 codes from Medicare claims to compute a global measure of resident disease burden -- the count of medication-sensitive conditions derived from the Prescription Drug Hierarchical Coexisting Condition (RxHCC) model used by CMS to risk adjust payments to Part D plans.¹¹

Statistical analysis. Descriptive findings for aim 1 are presented in two tables with statistics for all Medicare beneficiaries who have SNF stays and for the two subpopulations who either have other related LTCF stays or not. The first table presents population characteristics at the person level. The second table presents frequencies of possible residential combinations at the PPM level.

Unadjusted results for aims 2 and 3 are summarized in a table showing mean PPM drug utilization and cost statistics by residential situation for the subpopulation with other LTCF stays. 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 7.

We employed regression analysis to determine if there are significant differences in medication utilization and spending levels by residential situation status controlling for possible confounding factors. Seven OLS regressions were estimated with PPM drug measures as the dependent variables (counts of legend drugs, OTCs, and all drugs; administrations for legend drugs, OTC, and all drugs; and expenditures for legend drugs only). The primary explanatory variables are five residential situation status categories with "facility-only days" as the reference group. Covariates included all the variables shown in Table 1 plus the "potential LTCF therapy days" variable that standardizes each person-month observation for LTCF medication-eligible days.

¹⁰ The MCBS Cost and Use files contain detailed plan-level information about prescription coverage for community-dwelling Medicare beneficiaries. However, there are no specific questions about drug coverage for institutionalized beneficiaries. In some cases, we could infer that LTCF residents had drug coverage based on Medicaid enrollment records. All traditional Medicaid programs offer prescription coverage to LTCF 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 sub-sample of LTCF residents we could track private health insurance and prescription benefits prior to LTCF admission. In such cases, we deemed residents who had prior drug coverage to have it while institutionalized. Finally, we could determine whether LTCF 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).

¹¹ The RxHCC is derived using the same hierarchical coexisting condition methodology as its parent, the DCG/HCC model (Pope, 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-sensitive conditions for each beneficiary in the study sample.

TABLE 1. Characteristics of Medicare Beneficiaries with SNF Stays by Long-Term Care Facility Residential Status, 2001

Characteristics	Total Medicare Beneficiaries with SNF Stays ^a	Beneficiaries with SNF Stays and no other Long-Term Care Facility Stay ^{a,b}	Beneficiaries with SNF Stays and some other Long-Term Care Facility Stay ^{a,c}
Beneficiaries (in sample)	589	308	281
Beneficiaries (nationally weighted)	1,617,606	916,481	701,124
SNF stay characteristics			
Mean number of SNF stays	1.4	1.3	1.6
Mean number of SNF days	30.1	20.6	42.6
Mean SNF reimbursement (\$)	\$8,179	\$6,244	\$10,734
Age (%)			
Under age 65 SSDI	5.5	5.6	5.3
65 - 74 years	20.3	25.6	13.4
74 - 85 years	43.4	48.3	37.0
85+ years	30.8	20.5	44.3
Gender (%)			
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 poverty line (%)			
< 100% of FPL	21.1	12.4	32.4
100-200% of FPL	40.0	42.6	36.7
200-300% of FPL	18.3	21.8	13.6
> 300% of FPL	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 (count)	11.0	10.6	11.5
Died (%)	23.9	14.0	36.8

SOURCE: MCBS, 2001.

- a. Weighted to be nationally-representative.
- b. Defined as beneficiaries who have SNF stays and no other recorded residence in a LTCF.
- c. Defined as beneficiaries with SNF stays and one or more recorded stays in a LTCF.

We tested the impact of prescription coverage on differences in drug use by residential situation using interaction terms in a second series of regressions.¹² The fact that our study subjects all had some exposure to both SNF and non-qualified LTCF stays represents a natural experiment that can be analytically exploited. The hypothesis that bearing risk for medication costs leads to reduced medication use during SNF stays can be tested by comparing regression-adjusted utilization rates among beneficiaries who have drug coverage in months with SNF-only days and facility-only days. If the hypothesis is true, we would find that utilization rates are lower in the months with SNF-only days, all else being equal. Likewise, the hypothesis that beneficiaries with no drug coverage will experience lower utilization rates during non-qualified LTCF months can be tested in a similar fashion. In the first set of tests, we re-estimate the original seven regressions, but include an interaction term of "has prescription coverage" and "SNF-only days" with "no prescription coverage" and "facility-only days" as reference groups. Significant negative coefficients on the interaction terms would support the hypothesis that risk bearing may reduce medication use and cost. In the second set of tests, we estimate otherwise identical regressions with interaction terms for "no prescription coverage" and "facility-only days" with "has prescription coverage" and "SNF-only days" as reference categories. Negative coefficient on the interaction terms in these models would support the hypotheses that lack of prescription coverage leads to reduced medication use. All regressions were estimated using the robust command in Stata 7.

RESULTS

In 2001, more than 1.6 million Medicare beneficiaries had one or more qualified SNF stays. Of these individuals, approximately 43% had evidence of another related LTCF stay and 57% did not. The characteristics of the two subgroups differ substantially. Those with other LTCF stays had 23% 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% higher Medicare SNF reimbursement (\$10,734 versus \$6,244).

There are equally large differences in personal characteristics between the two groups. Beneficiaries with SNF plus other LTCF stays are much older on average (44.3% aged 85+ compared to 20.5% for beneficiaries with only SNF episodes), much less likely to be married (19.6% versus 32.7%), and have much lower levels of socioeconomic status. Over half (53.8%) of beneficiaries with SNF and other LTCF stays failed to graduate high school compared to 39% for those with stand-alone SNF stays. Income differences are even more dramatic, with almost a third (32.4%) of beneficiaries with both SNF and LTCF stays falling below the FPL compared to just 12.4% for those with SNF stays alone. Medicaid represented the primary source of prescription coverage for beneficiaries with SNF and LTCF stays (43.8%). A majority (58.0%) of beneficiaries with stand-alone SNF stays obtained prescription coverage

¹² The reason we estimated two sets of regressions is that each set required different reference categories for resident situation and drug coverage.

from other sources (primarily from employer sponsored health insurance plans). Medicaid (13.4%) 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-sensitive conditions based on the RxHCC risk adjustment model compared to 11.5 conditions for those with other LTCF episodes. Annual mortality was dramatically higher in the SNF plus other LTCF group (36.8%) compared to the SNF-only group (14.0%).

Table 2 provides a breakdown of residential situations for the study sample and subpopulations with and without related LTCF stays. The table records the percent of months beneficiaries spent in various combinations of residential situations involving the community, SNF, and other LTCFs. Situations involving more than one status imply residential transfers.¹³ 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.

TABLE 2. Characteristics of Residential Situations for Medicare Beneficiaries with SNF Stays with or without Other Long-Term Care Facility Stays, 2001			
Residential Situation	Proportion of Months by Residential Situation		
	Medicare Beneficiaries with SNF Stays ^a	Beneficiaries with SNF Stays and no other Long-Term Care Facility Residential Stay ^{a,b}	Beneficiaries with SNF Stays and some other Long-Term Care Facility Residential Stay ^{a,c}
Community only	57.4%	84.7%	17.3%
Community + SNF	9.7	13.9	3.6
Community + SNF + facility	0.6	NA ^d	1.4
SNF-only	3.6	1.4	6.8
SNF + facility	6.1	NA	15.0
Facility-only	22.1	NA	54.4
Facility + community	0.5	NA	1.2

SOURCE: MCBS, 2001.

a. Weighted to be nationally-representative.
b. Defined as beneficiaries who have SNF stays and no other recorded residence in a LTCF.
c. Defined as beneficiaries with SNF stays and one or more recorded stays in a LTCF.
d. Not applicable.

The percentage distributions shown in Table 2 are computed on the basis of the number of months each beneficiary was a SNF and/or facility resident during the study year. Because of higher death rates in the SNF + LTCF 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% for the population with SNF and other LTCF stays compared to 83.4% for the

¹³ A SNF-to-LTCF transfer may or may not result in a physical transfer; frequently, the resident remains in the same facility and only the payment status changes.

group without other LTCF stays). The stand-alone SNF sample has zero facility days by definition; those in the facility sample spent an average of 56.6% of months in LTCFs. The distribution of SNF days across the year varies as well. For the stand-alone SNF group, just 1.4% of months were spent wholly in a SNF stay compared to 6.8% in the SNF + LTCF group. For the stand-alone SNF group 15.1% 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%), SNF-to-community transfers (31%), and community-to-SNF-to-community transfers (30%), with 4% having more complex residential situations. Each of these transfers involved an intervening acute hospitalization. Beneficiaries with SNF and other LTCF stays had a higher proportion of months with complex residential situations: 20% of all months involved SNF days in combination with community and/or facility days. Sixty-two percent of all transfers recorded by month were facility-to-SNF, SNF-to-facility, or facility-to-SNF-to-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. Medication Utilization and Expenditures for Medicare Beneficiaries with SNF and Other Long-Term Care Facility Stays, 2001

Medication Measures Per Patient Month	Residential Situation		
	Months with only SNF Days ^a	Months with SNF and Facility Days ^a	Months with only Facility Days ^a
Number of months with residential situation	195	433	1,610
Mean potential LTCF therapy days per month ^b	30.2 days	24.2 days	29.3 days
Percent of months with medication use	94.4%	91.5%	94.3%
Mean number of unique medications (se)			
OTC drugs	2.9 (0.2)	2.7 (0.1)	2.8 (0.5)
Prescription-only drugs	6.3 (0.3)	6.7 (0.2)	6.3 (0.1)
Total drugs	9.2 (0.4)	9.4 (0.3)	9.1 (0.1)
Mean number of drug administrations (se)			
OTC drugs	99.5 (7.1)	79.4 (4.3)	109.4 (2.5)
Prescription-only drugs	237.3.8 (12.0)	195.7 (7.2)	248.8 (4.0)
Total drugs	336.8 (15.4)	275.1 (9.9)	358.3 (5.4)
Mean monthly expense for prescription-only drugs (se)	\$264 (15.8)	\$224 (11.3)	\$246 (5.2)
Mean expense per prescription	\$41.90	\$33.43	\$39.05

SOURCE: MCBS, 2001.

a. Weighted to be nationally-representative.
b. The mean month contains 30.4 days.

Table 3 presents statistics on medication use and spending for the sub-sample of beneficiaries with SNF and other LTCF stays. The three residential situations represented in this table (SNF-only, SNF + facility, and facility-only) comprise 76% of the observation period for these beneficiaries during 2001. By definition, there is no IDA drug capture during the 17.4% of months beneficiaries spent in the community. The sample sizes in the remaining three residential situations (community + SNF,

community + SNF + facility, and facility + community) are too small for stable drug utilization estimates and thus are excluded from the remaining analyses.

Unadjusted utilization rates are similar across the three major residential situations. Medications are administered in a very high proportion of all resident months, ranging from 91.5% in SNF + facility months to 94.4% 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% representing legend drugs and the remainder OTC products in each of the three residential situations.

There is more variation in numbers of PPM administrations for legend and OTC medications. Mean monthly medication administrations are highest in months with facility-only days (358) for an average of 39.4 medication administrations per drug, and lowest in months with facility + SNF days at 275 per month or 29.2 administrations per drug. Medication administration rates for months with only SNF days are slightly lower than months with only facility days. The higher variation in administration rates compared to numbers of unique medications is consistent with the differences reported in number of potential LTCF therapy days per month. The mean month contains 30.4 days. The value of 30.2 potential therapy days for the sample of SNF-only months thus indicates that few beneficiaries had hospital episodes or died during these months. A similar interpretation applies to the 29.3 potential therapy days for the facility-only months. The much lower value of 24.2 potential therapy days for the SNF + facility months is primarily due to inpatient hospital stays during these episodes. Average monthly expenses for legend drugs vary from \$224 to \$264 PPM across the three residential situations. The average cost per script (mean expense divided by mean number of unique prescription drugs) is highest in months with SNF-only days (\$42) and lowest in months with SNF + facility days (\$33).

TABLE 4. Predicted Values for Medication Utilization and Expenditures for Medicare Beneficiaries by Residential Situation^a

Regression Model Dependent Variables	Predicted Values for Residential Situation ^b		
	Months with only SNF Days	Months with SNF and Facility Days	Months with only Facility Days
Mean number of unique medications (se)			
OTC drugs	3.0 (0.0)	2.7 (0.0)	2.9 (0.0)
Prescription-only drugs	6.2 (0.1)	6.6 (0.1)*	6.3 (0.0)
Total drugs	9.2 (0.2)	9.4 (0.1)*	9.1 (0.1)
Mean number of drug administrations (se)			
OTC drugs	102.3 (1.8)	81.6 (1.8)**	112.2 (0.8)
Prescription-only drugs	235.1 (5.2)*	195.7 (4.1)**	249.3 (1.8)
Total drugs	337.4 (6.3)*	277.3 (5.6)**	361.5 (2.4)
Mean monthly expense for prescription-only drugs (se)	\$255.7 (6.8)	\$222.6 (4.8)	\$245.0 (2.1)

SOURCE: MCBS, 2001.

a. Predicted values based on regression results shown in the Appendix. Covariates include all variables shown in Table 1 plus the “potential LTCF therapy day” variable.

b. (*) indicates that result is significantly different from the facility-only value at p<0.10.

(**) indicates that result is significantly different from the facility-only value at p<0.05.

Principal findings from the initial seven regressions models are summarized in Table 4 (full model results are presented in the Appendix). Comparing the actual utilization and spending values in Table 3 with the predicted values shown in Table 4 indicates that controlling for other factors, including drug coverage and potential LTCF therapy days, has a relatively small impact on measured differences in drug use by residential situation. There are significant differences between months with SNF + facility days and those with only facility days. In the former situation, beneficiaries are prescribed significantly more unique prescription drugs but receive fewer monthly drug administrations and the difference washes out when comparing monthly prescription drug costs. The only other significant findings are slightly lower rates of prescription and total drug administrations in SNF-only months compared to facility-only months. However these differences are not associated with significantly lower drug spending during SNF months.

The coefficients on the prescription coverage variables in these models present a mixed picture. The main effects of prescription coverage are consistently negative in the utilization equations, suggesting that coverage reduces rather than increases drug use. The effects are quite strong in the medication administration equations for both legend and OTC drugs. 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 14 regression models in which they were tested (results not shown), indicating that neither prescription coverage nor facility risk bearing has a substantive impact on aggregate medication utilization and spending patterns in transitions between SNF episodes and other LTCF stays.

DISCUSSION

The results of this study indicate that different LTCF residential situations involving SNF stays have little bearing on the aggregate level and cost of prescription and OTC medications received by Medicare beneficiaries. Whether this continues to be the case following the implementation of Part D remains to be seen. However, given our finding that beneficiaries with and without prescription coverage had similar medication patterns during non-qualifying LTCF stays, we would not expect the new drug benefit to have a major impact on medication management over the transition between SNF episodes and other LTCF stays. As in our previous work (Stuart, et al., 2006; Simoni-Wastila, et al., 2006), null findings are a testament to the highly structured and regulated procedures relating to prescribing and medication administration in NHs and other high-end LTCFs.

The study has several important limitations. First is the fact that the results can only be generalized to SNF episodes in conjunction with other LTCF stays. The detailed prescription drug and OTC utilization data in the IDA files are only available for residents of LTCFs, 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. A second limitation is the small sample size. The 2001 MCBS surveyed 1,222 beneficiaries with some LTCF 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 contiguous non-qualifying LTCF stays. As such, they can be used to benchmark post-Part D experience when the Medicare drug claims become available to the research community.

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APPENDIX: REGRESSION RESULTS

Count of Legend drugs = rxtime + (person month types) + (demographics) + (poverty status)
+ (rx coverage type) + comorbidity index + dead flag

Linear regression

Number of obs	=	2238
F(23, 2214)	=	30.92
Prob > F	=	0.0000
R-squared	=	0.2323
Root MSE	=	3.2286

legcnt	Robust					
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
rxtime	0.065980	0.0184064	3.58	0.000	0.029884	0.102076
cs_pm	(dropped)					
csf_pm	(dropped)					
s_pm	-0.232531	0.2643540	-0.88	0.379	-0.750938	0.285876
fs_pm	0.389885	0.2053784	1.90	0.058	-0.012868	0.792640
fc_pm	(dropped)					
under65	3.125548	0.3164648	9.88	0.000	2.504949	3.746147
age65to74	0.277049	0.2609252	1.06	0.288	-0.234634	0.788732
age75to84	1.113687	0.1573012	7.08	0.000	0.805213	1.422161
male	-1.375288	0.1745604	-7.88	0.000	-1.717607	-1.032969
nonwhite	-0.954732	0.2113599	-4.52	0.000	-1.369217	-0.540248
married	0.725180	0.2223131	3.26	0.001	0.289216	1.161145
othsingle	-0.609340	0.1921517	-3.17	0.002	-0.986157	-0.232524
hsgrad	-0.554251	0.1732266	-3.20	0.001	-0.893955	-0.214548
posthsedu	-0.202533	0.2157984	-0.94	0.348	-0.625721	0.220655
east	-1.408958	0.1734617	-8.12	0.000	-1.749123	-1.068793
midwest	0.035248	0.1941738	0.18	0.856	-0.345533	0.416129
west	-0.451394	0.2290992	-1.97	0.049	-0.900665	-0.002122
fpl100to200	-0.358923	0.1697464	-2.11	0.035	-0.694802	-0.026044
fpl200to300	-0.119480	0.2554424	-0.47	0.640	-0.620412	0.381451
fplover300	-0.072500	0.2397121	-0.30	0.762	-0.542584	0.391583
rxmedicaid	-0.223022	0.1925837	-1.16	0.247	-0.600686	0.154641
rxother	-0.339079	0.2896529	-1.17	0.242	-0.907099	0.228940
rxcvgunk	-0.139411	0.1975045	-0.71	0.480	-0.526724	0.247902
rxhcc_sumhcc	0.342650	0.1996177	17.17	0.000	0.303504	0.381796
dead	0.215980	0.1759667	1.23	0.220	-0.129096	0.561057
_cons	1.257263	0.6499459	1.93	0.053	-0.017304	2.531831

Count of OTC drugs = rxtime + (person month types) + (demographics) + (poverty status) + (rx coverage type) + comorbidity index + dead flag

Linear regression

Number of obs	=	2238
F(23, 2214)	=	10.92
Prob > F	=	0.0000
R-squared	=	0.0893
Root MSE	=	2.0293

otccnt	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
rxtime	0.053519	0.0090234	5.93	0.000	0.035824 0.071214
cs_pm (dropped)					
csf_pm (dropped)					
s_pm	0.187531	0.1636009	1.15	0.252	-0.133296 0.508358
fs_pm	0.109529	0.1207348	0.91	0.364	-0.127235 0.346294
fc_pm (dropped)					
under65	0.065082	0.2190380	0.30	0.766	-0.364458 0.494624
age65to74	0.044630	0.1625979	0.27	0.784	-0.274229 0.363490
age75to84	0.051310	0.0970652	0.53	0.597	-0.139038 0.241658
male	-0.452891	0.1062260	-4.26	0.000	-0.661204 -0.244578
nonwhite	-0.647321	0.1263010	-5.13	0.000	-0.895002 -0.399640
married	-0.370852	0.1178932	-3.15	0.002	-0.602045 -0.139659
othsingle	0.223398	0.1432293	1.56	0.119	-0.057479 0.504276
hsgrad	-0.435150	0.1227182	-3.55	0.000	-0.675805 -0.194495
posthsedu	0.171642	0.1285074	1.34	0.182	-0.080365 0.423649
east	-0.055259	0.1156250	-0.48	0.633	-0.282003 0.171485
midwest	0.388983	0.1181557	3.29	0.001	0.157275 0.620691
west	0.500425	0.1590738	3.15	0.002	0.188475 0.812374
fpl100to200	-0.555090	0.1155080	-4.81	0.000	-0.781606 -0.328575
fpl200to300	-0.769937	0.1691021	-4.55	0.000	-1.101552 -0.438321
fplover300	-0.800642	0.1543356	-5.19	0.000	-1.103300 -0.497984
rxmedicaid	-0.338128	0.1222621	-2.77	0.006	-0.577888 -0.098368
rxother	0.035155	0.1760380	0.20	0.842	-0.310061 0.380372
rxcvgunk	-0.017524	0.1247513	-0.14	0.888	-0.262166 0.227116
rxhcc_sumhcc	0.044753	0.0109482	4.09	0.000	0.023283 0.066223
dead	0.272450	0.1140844	2.39	0.017	0.048726 0.496174
_cons	1.279793	0.3397908	3.77	0.000	0.613450 1.946135

Count of All drugs = rxtime + (person month types) + (demographics) + (poverty status)
+ (rx coverage type) + comorbidity index + dead flag

Linear regression

Number of obs	=	2238
F(23, 2214)	=	28.24
Prob > F	=	0.0000
R-squared	=	0.1993
Root MSE	=	4.3081

rxcnt	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
rxtime	0.119461	0.0243780	4.90	0.000	0.071655 0.167267
cs_pm (dropped)					
csf_pm (dropped)					
s_pm	-0.044334	0.3406298	-0.13	0.896	-0.712321 0.623653
fs_pm	0.499789	0.2765334	1.81	0.071	-0.042502 1.042081
fc_pm (dropped)					
under65	3.189511	0.4383798	7.28	0.000	2.329832 4.049189
age65to74	0.317042	0.3459903	0.92	0.360	-0.361457 0.995542
age75to84	1.165148	0.2041884	5.71	0.000	0.764727 1.565569
male	-1.827392	0.2322332	-7.87	0.000	-2.282810 -1.371975
nonwhite	-1.601523	0.2762073	-5.80	0.000	-2.143176 -1.059871
married	0.355534	0.2766719	1.29	0.199	-0.187029 0.898097
othsingle	-0.385039	0.2730392	-1.41	0.159	-0.920479 0.150400
hsgrad	-0.990708	0.2345496	-4.22	0.000	-1.450669 -0.530748
posthsedu	-0.030948	0.2904475	-0.11	0.915	-0.600523 0.538629
east	-1.464218	0.2336251	-6.27	0.000	-1.922365 -1.006070
midwest	0.422658	0.2594045	1.63	0.103	-0.086042 0.931360
west	0.049514	0.3112722	0.16	0.874	-0.560901 0.659930
fpl100to200	-0.913493	0.2311470	-3.95	0.000	-1.366781 -0.460206
fpl200to300	-0.889144	0.3548668	-2.51	0.012	-1.585051 -0.193237
fplover300	-0.874991	0.3088217	-2.83	0.005	-1.480602 -0.269381
rxmedicaid	-0.561056	0.2620425	-2.14	0.032	-1.074931 -0.047181
rxother	-0.303013	0.3834735	-0.79	0.430	-1.055018 0.448992
rxcvgunk	-0.158252	0.2609224	-0.61	0.544	-0.669930 0.353425
rxhcc_sumhcc	0.387269	0.2526400	15.33	0.000	0.337725 0.436812
dead	0.489243	0.2428795	2.01	0.044	0.012947 0.965538
_cons	2.539551	0.8547808	2.97	0.003	0.863295 4.215807

Count of Legend admins = rxtime + (person month types) + (demographics) + (poverty status) + (rx coverage type) + comorbidity index + dead flag

Linear regression

Number of obs	=	2238
F(23, 2214)	=	41.87
Prob > F	=	0.0000
R-squared	=	0.2399
Root MSE	=	140.09

leg_adm	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
rxtime	7.758727	0.510643	15.19	0.000	6.757336 8.760117
cs_pm (dropped)					
csf_pm (dropped)					
s_pm	-20.69203	11.34285	-1.82	0.068	-42.93577 1.551708
fs_pm	-19.92481	7.740280	-2.57	0.010	-35.10377 -4.745838
fc_pm (dropped)					
under65	153.0344	15.63908	9.79	0.000	122.3656 183.7032
age65to74	16.08311	10.15291	1.58	0.113	-3.827122 35.99334
age75to84	40.60255	6.743111	6.02	0.000	27.37907 53.82604
male	-44.80531	7.092717	-6.32	0.000	-58.71438 -30.89623
nonwhite	-15.53399	10.73379	-1.45	0.148	-36.58333 5.515354
married	20.04384	8.759236	2.29	0.022	2.866664 37.22102
othsingle	16.03621	9.428441	1.70	0.089	-2.453306 34.52572
hsgrad	-15.63674	7.548849	-2.07	0.038	-30.44030 -0.833170
posthsedu	-28.45326	8.939135	-3.18	0.001	-45.98323 -10.92330
east	-51.84296	7.313162	-7.09	0.000	-66.18434 -37.50159
midwest	2.922769	8.502588	0.34	0.731	-13.75111 19.59665
west	-23.20672	10.21168	-2.27	0.023	-43.23219 -3.181244
fpl100to200	-15.08978	7.335409	-2.06	0.040	-29.47478 -0.704781
fpl200to300	-23.39779	10.46918	-2.23	0.026	-43.92824 -2.867343
fplover300	13.53342	10.11681	1.34	0.181	-6.306021 33.37285
rxmedicaid	-29.33824	8.503219	-3.45	0.001	-46.01336 -12.66312
rxother	-36.01664	11.67702	-3.08	0.002	-58.91570 -13.11757
rxcvgunk	-13.00564	8.442675	-1.54	0.124	-29.56203 3.550755
rhcsumhcc	11.85737	0.864220	13.72	0.000	10.16261 13.55214
dead	-5.847132	7.604141	-0.77	0.442	-20.75913 9.064862
_cons	-82.86463	21.91351	-3.78	0.000	-125.8378 -39.89145

Count of OTC admins = rxtime + (person month types) + (demographics) + (poverty status) + (rx coverage type) + comorbidity index + dead flag

Linear regression

Number of obs	=	2238
F(23, 2214)	=	20.05
Prob > F	=	0.0000
R-squared	=	0.1146
Root MSE	=	95.518

otc_adm	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
rxttime	3.814677	0.301997	12.63	0.000	3.22245 4.406905
cs_pm (dropped)					
csf_pm (dropped)					
s_pm	-9.194011	7.625988	-1.21	0.228	-24.14885 5.760826
fs_pm	-12.65477	5.332818	-2.37	0.018	-23.11262 -2.196926
fc_pm (dropped)					
under65	2.866162	10.59839	0.27	0.787	-17.91766 23.64998
age65to74	-11.55972	6.472942	-1.79	0.074	-24.25339 1.133950
age75to84	6.013818	4.772845	1.26	0.208	-3.345903 15.37354
male	-5.255518	5.109163	-1.03	0.304	-15.27477 4.763734
nonwhite	-10.46553	7.712902	-1.36	0.175	-25.59081 4.659746
married	-9.009822	5.577744	-1.62	0.106	-19.94798 1.928336
othsingle	17.97681	7.299439	2.46	0.014	3.662349 32.29127
hsgrad	-19.49912	5.381796	-3.62	0.000	-30.05302 -8.945230
posthsedu	-1.552462	6.079748	-0.26	0.798	-13.47507 10.37014
east	0.325777	5.471673	0.06	0.953	-10.40437 11.05593
midwest	8.678072	5.195882	1.67	0.095	-1.511241 18.86738
west	11.43262	7.557367	1.51	0.130	-3.387650 26.25289
fpl100to200	-23.32940	5.420624	-4.30	0.000	-33.95944 -12.69936
fpl200to300	-30.30353	6.905294	-4.39	0.000	-43.84506 -16.76200
fplover300	-30.90401	5.971405	-5.18	0.000	-42.61415 -19.19387
rxmedicaid	-21.54953	6.152081	-3.50	0.000	-33.61398 -9.485076
rxother	-5.001603	6.970862	-0.72	0.473	-18.67171 8.668508
rxcvgunk	-10.51194	5.158668	-2.04	0.042	-20.62827 -0.395605
rhcsumhcc	3.085665	0.470556	6.56	0.000	2.162887 4.008444
dead	0.544315	4.590898	0.12	0.906	-8.458602 9.547232
_cons	-11.36885	12.68622	-0.90	0.370	-36.24699 13.50928

Count of All admins = rxtime + (person month types) + (demographics) + (poverty status) + (rx coverage type) + comorbidity index + dead flag

Linear regression

Number of obs	=	2238
F(23, 2214)	=	40.49
Prob > F	=	0.0000
R-squared	=	0.2362
Root MSE	=	191.57

timesadm	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
rxtimetime	11.57340	0.703594	16.45	0.000	10.19363 12.95318
cs_pm (dropped)					
csf_pm (dropped)					
s_pm	-29.88604	15.41426	-1.94	0.053	-60.11395 0.341870
fs_pm	-32.57958	10.74025	-3.03	0.002	-53.64160 -11.51756
fc_pm (dropped)					
under65	155.9006	22.66153	6.88	0.000	111.4605 200.3407
age65to74	4.523385	13.91135	0.33	0.745	-22.75726 31.80403
age75to84	46.61637	9.208329	5.06	0.000	28.55851 64.67424
male	-50.06082	10.21456	-4.90	0.000	-70.09194 -30.02971
nonwhite	-25.99952	15.32425	-1.70	0.090	-56.05093 4.051887
married	11.03402	11.70664	0.94	0.346	-11.92312 33.99116
othsingle	34.01302	14.16752	2.40	0.016	6.229998 61.79604
hsgrad	-35.13586	9.822592	-3.58	0.000	-54.39832 -15.87340
posthsedu	-30.00573	12.40333	-2.42	0.016	-54.32911 -5.682345
east	-51.51719	10.41600	-4.95	0.000	-71.94334 -31.09103
midwest	11.60084	11.33853	1.02	0.306	-10.63443 33.83611
west	-11.77410	13.84786	-0.85	0.395	-38.93026 15.38206
fpl100to200	-38.41918	10.19603	-3.77	0.000	-58.41397 -18.42440
fpl200to300	-53.70132	13.72214	-3.91	0.000	-80.61094 -26.79170
fplover300	-17.37060	12.13973	-1.43	0.153	-41.17704 6.435853
rxmedicaid	-50.88777	11.92304	-4.27	0.000	-74.26927 -27.50626
rxother	-41.01824	15.07524	-2.72	0.007	-70.58132 -11.45516
rxcvgunk	-23.51758	10.93608	-2.15	0.032	-44.96363 -2.071525
rxhcc_sumhcc	14.94304	1.104524	13.53	0.000	12.77703 17.10905
dead	-5.302817	10.12644	-0.52	0.601	-25.16113 14.55549
_cons	-94.23348	29.00423	-3.25	0.001	-151.1118 -37.35513

Legend expenditures = rxtime + (person month types) + (demographics) + (poverty status) + (rx coverage type) + comorbidity index + dead flag

Linear regression

Number of obs	=	2238
F(23, 2214)	=	20.82
Prob > F	=	0.0000
R-squared	=	0.1873
Root MSE	=	187.34

postadj_ev-r	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
rxtime	7.184296	0.832778	8.63	0.000	5.551188 8.817404
cs_pm (dropped)					
csf_pm (dropped)					
s_pm	4.048525	14.47660	0.28	0.780	-24.34062 32.43767
fs_pm	5.319778	12.00193	0.44	0.658	-18.21643 28.85599
fc_pm (dropped)					
under65	180.0393	21.80510	8.26	0.000	137.2787 222.7999
age65to74	85.57105	27.46694	3.12	0.002	31.70740 139.4347
age75to84	50.24626	7.770403	6.47	0.000	35.00822 65.48430
male	-40.76956	9.052477	-4.50	0.000	-58.52179 -23.01732
nonwhite	-79.74202	14.78811	-5.39	0.000	-108.7420 -50.74201
married	15.38922	11.04422	1.39	0.164	-6.268893 37.04733
othsingle	-2.898512	11.83920	-0.24	0.807	-26.11561 20.31859
hsgrad	-12.95768	9.885260	-1.31	0.190	-32.34303 6.427670
posthsedu	12.49730	11.07340	1.13	0.259	-9.218033 34.21264
east	-41.11765	10.81812	-3.80	0.000	-62.33237 -19.90292
midwest	-3.456650	10.48677	-0.33	0.742	-24.02159 17.10829
west	-15.30318	12.82483	-1.19	0.233	-40.45313 9.846767
fpl100to200	-49.52520	10.39388	-4.76	0.000	-69.90798 -29.14242
fpl200to300	-34.27239	16.68409	-2.05	0.040	-66.99049 -1.554301
fplover300	-26.63591	14.85566	-1.79	0.073	-55.76839 2.496573
rxmedicaid	21.67045	14.79232	1.46	0.143	-7.337827 50.67873
rxother	20.48931	15.99779	1.28	0.200	-10.88293 51.86156
rxcvgunk	27.20647	10.78106	2.52	0.012	6.064430 48.34851
rhcsumhcc	15.38383	1.263289	12.18	0.000	12.90647 17.86118
dead	-22.00915	10.96041	-2.01	0.045	-43.50291 -0.515399
_cons	-121.3951	34.35393	-3.53	0.000	-188.7643 -54.02577

LIST OF REPORTS

Prescription Drug Spending by Medicare Beneficiaries in Institutional and Residential Settings, 1998-2001

HTML version: <http://aspe.hhs.gov/daltcp/reports/2007/pdspend.htm>

PDF version: <http://aspe.hhs.gov/daltcp/reports/2007/pdspend.pdf>

POLICY BRIEF #1: National Estimates of Prescription Drug Utilization and Expenditures in Long-Term Care Facilities

HTML version: <http://aspe.hhs.gov/daltcp/reports/2006/pdnatest.htm>

PDF version: <http://aspe.hhs.gov/daltcp/reports/2006/pdnatest.pdf>

POLICY BRIEF #2: A National Comparison of Prescription Drug Expenditures by Medicare Beneficiaries Living in the Community and Long-Term Care Facility Settings

HTML version: <http://aspe.hhs.gov/daltcp/reports/2007/pdnatcom.htm>

PDF version: <http://aspe.hhs.gov/daltcp/reports/2007/pdnatcom.pdf>

POLICY BRIEF #3: Drug Use and Spending for Medicare Beneficiaries During Part A Qualifying Skilled Nursing Facility Stays and Non-Qualifying Long-Term Care Facility Stays

HTML version: <http://aspe.hhs.gov/daltcp/reports/2007/druguse.htm>

PDF version: <http://aspe.hhs.gov/daltcp/reports/2007/druguse.pdf>