



Long Term Services and Supports Evaluation of Rebalancing Strategies

Quantitative Analyses

HEALTHCARE AND HUMAN SERVICES POLICY, RESEARCH, AND CONSULTING—WITH REAL-WORLD PERSPECTIVE.



Prepared for: **Rhode Island's Executive Office of Health and Human Services**

Submitted by: **The Lewin Group, Inc.**

October 31, 2016



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Executive Summary

Introduction

The Lewin team – Lewin Group, Brown University, Faulkner Consulting, and University of Connecticut, was contracted by the Executive Office of the Health and Human Services (EOHHS) to conduct an evaluation of the Long-Term Services and Supports Rebalancing Strategies to aid the state of Rhode Island in identifying actions, activities, and policies to reform and rebalance the LTSS. Three major activities were performed as part of this project:

- Environmental scan to understand Rhode Island’s current policies and activities around rebalancing the system and other states’ mechanisms for change, activities, and impact
- Focused data analyses to identify precipitating factors for individuals in need of or receiving LTSS in Rhode Island (including the “Pre-Medicaid” population and those already enrolled in Medicaid) and to provide data related to the recommendations
- Engagement of stakeholders (e.g., consumers, advocates, providers, policymakers) as key contributors to the development of the initial and refined actions, activities, and policies

This report details the findings from the data analyses to describe the events and circumstances that precede and follow entry into LTSS for three key populations:

- 1) The “pre-Medicaid” population (those not enrolled in Medicaid prior to using LTSS),
- 2) The Medicaid-enrolled population, and
- 3) Nursing facility residents referred for transition back to the community.

The Lewin team used two data sources to evaluate these populations:

- *HealthFacts RI*, the state’s All-Payer Claims Database (APCD): Rhode Island’s APCD vendor, OnPoint, supplied the APCD data which included commercial, Medicaid (fee-for-service and managed care), and Medicare (traditional and Medicare Advantage) claims from participating entities with claims submitted beginning in 2011.
- *Money Follows the Person/Nursing Home Transition Program (MFP/NHTP) Dataset*: Both MFP and NHTP were designed to support nursing home residents to transition back into the community with necessary supports to experience more independence. NHTP was implemented in Rhode Island in 2009. Individuals identified for community transition through NHTP receive a limited case management benefit. MFP, also referred to *The Rhode to Home*, is a demonstration grant program with an enhanced federal match to state dollars for home- and community-based services (HCBS) initiated in November 2011. MFP participants receive case management and other transition services for 365 days following the date of transition. Whereas the primary eligibility criterion for NHTP is Medicaid enrollment, MFP has more stringent eligibility criteria: 1) Medicaid enrollment, 2) residing in a nursing facility for a minimum of 90 days, and 3) the individual must move to a qualified community residence.

Results

Results of our analyses are organized around the data sources applied. The pre-Medicaid and Medicaid populations using LTSS are evaluated using the APCD and the nursing home transition population is evaluated using the MFP/NHTP data.

APCD

The APCD analysis provides a better understanding of individuals using LTSS in Rhode Island across setting and payer source. The Lewin team used the APCD to group individuals based on their LTSS utilization into the following categories:

1. Facility-based LTSS first, followed by HCBS use;
2. Facility-based LTSS use only;
3. HCBS first, following by facility-based LTSS; and
4. HCBS use only.

To better understand the circumstances associated with entry to LTSS, we focused on analyses of service utilization and spending in the 30 days immediately prior to the start of LTSS use. The following are some key findings from the work and program and policy recommendations. Suggestions for further analysis can be found in the discussion at the end of the report.

- LTSS users made up approximately 8.1 percent (N=48,823) of the total unique individuals age 21 and over present in the APCD in Calendar Year (CY) 2013. Nearly half were enrolled in Medicare prior to LTSS entry, with 25 percent covered by commercial insurance, 15 percent enrolled in Medicaid, and 11 percent dually eligible for Medicare and Medicaid. Among the “pre-Medicaid” population that used facility-based LTSS (first or only), 11 percent “converted” to Medicaid eligibility following LTSS entry.
- We analyzed the predictors of facility-based LTSS relative to HCBS use separately for those who were Medicare-only or commercially insured prior to LTSS use and for those who were dually eligible for Medicare and Medicaid or were enrolled in Medicaid only. Our findings reveal important similarities in both populations regarding the predictors of facility use versus HCBS. In both populations, inpatient use drives facility admissions and specialty care has an important association with facility use. Older, Medicare-eligible individuals and those with dementia or delirium are more likely to use facility-based LTSS compared to HCBS.
- Approximately 95 percent of the facility-only LTSS users enter the facility directly from the community; only 5 percent had an inpatient admission in the prior 30 days. These individuals are more likely to be older, female, and Medicaid eligible prior to facility entry (39 percent are either dual eligibles or Medicaid-only). This group also has a substantially higher prevalence of dementia/delirium than any other LTSS user group (47 percent compared to the population average prevalence of 4 percent).

- Those who enter a facility first and later use HCBS are the most expensive group, with Medicare paying the majority of the costs. Approximately 65 percent had one or more inpatient admissions in the 30 days prior to facility admission, contributing substantially to their costs. The results of regression analyses reveal that inpatient use in the 30 days prior to entry is a substantial and significant predictor of facility-based LTSS use.
- The group who used HCBS first followed by facility-based LTSS had similar demographic and clinical profiles when compared to those who used facility-based LTSS first and HCBS later. HCBS utilization patterns are also very similar. However, their overall costs were lower than those who used facility services first. Only about 9 percent of those who used HCBS first followed by facility-based LTSS had an inpatient admission immediately prior to LTSS use.
- Those who enrolled in Medicaid after entering facility-based LTSS was primarily a Medicare population; those enrolled in commercial insurance prior to LTSS use were a very small proportion of the total “Medicaid conversion” population. Most entered the facility directly from the community and were more likely to have had a diagnosis of dementia or delirium.
- Specialty provider (e.g., medical/surgical specialties) spending had a significant and positive association with facility-based LTSS relative to HCBS.

Program and Policy Implications

- A large proportion of the facility-based LTSS group enters a facility directly from the community without an inpatient admission. Identifying those who have LTSS needs in order to divert them from facility-based LTSS to HCBS is a critical challenge. Given that a large number of those who move directly from the community into a facility have dementia, engaging the community-based resources specific to Alzheimer’s disease and related dementia is important. There is an opportunity to do outreach and assess for need in the community-based population with dementia, educating caregivers and providing support to caregivers such as respite care than can extend the time the individual with dementia can remain in the community. The state’s ADRC/The POINT can play an important role in conducting the outreach and educating caregivers and that role should be reinforced.
- EOHHS should give special attention to the role of acute care hospitals and specialty providers given the significant association between inpatient use and subsequent LTSS use. When an inpatient admission is known and planned for, providers have an opportunity to plan for what happens after the inpatient admission. EOHHS might consider pilot testing approaches to support care transitions, similar to those available through CMS’ Community-based Care Transitions Project (CCTP) either through existing hospital and community-based organization relationships or through the Accountable Entities under consideration in Rhode Island.
- The quantitative analyses suggest that specialty care providers may play an influential role in the decision to enter facility-based LTSS and thus these providers should be a part of the solution as well. Training opportunities to sensitize providers to geriatric competencies as well as training on the services and supports available in the community

as an alternative to facility-based LTSS can begin to change referral patterns. Further, EOHHS will also want to directly engage specialty providers in the incentives that may be available through Accountable Entities.

- Planned admissions may be more amenable to diversion efforts intended to avoid further placement in facility-based LTSS or to ensure that the facility placement is short-term as a result of pre-planning before the hospital stay, preparing the patient and his/her family for post-discharge care, as well as determining a treatment plan in advance. On the other hand, urgent hospital admissions may be associated with less planning, little time to prepare caregivers and the home setting for discharge, and little time to arrange the necessary services in the community to support safe discharge to the community. Urgent admissions create a challenge for discharge planning; specifically to arrange services in the community. In both planned and urgent admissions, informal supports or the home environment may not be available to safely meet the needs of an individual after hospital discharge. In these cases, nursing facility transition efforts become important and to help the individual come home or to find an alternative housing situation that will support safe discharge need engaging as soon as is feasible (see the discussion in the MFP/NHTP section of this report for more on this topic).

MFP/NHTP

The analysis of the MFP/NHTP data was designed to identify the characteristics of the population who participate in these programs and illuminate what factors are associated with successful transition back into the community. The following are some key findings from the work and program and policy recommendations. Suggestions for further analysis can be found in the discussion at the end of the report.

- In total, 2,749 referrals were documented as of July 2016. Approximately 68.7 percent of referrals did not result in a transition.
- We identified 684 referrals (24.9 percent) that resulted in community transition. Of these, 220 referrals resulted in transition to the community through MFP and the remaining 464 transitioned to the community through NHTP.
- MFP transitions identified in this analysis fall far short of the state's target transition goal for the program. The data are limited in helping us to better understand this finding more completely and more importantly, how to support successful transition. NHTP data are not as rich as MFP data and neither dataset is sufficiently detailed to track outcomes for all participants.
- The primary factor distinguishing those who transition through MFP from those who transition through NHTP were median time from admission to referral (190 days for MFP vs. 38 days for NHTP) and median time from referral to transition (72 days for MFP vs. 40 days for NHTP). Program policy and eligibility criteria (notably the requirement for MFP to be a resident of a facility for at least 90 days) are driving these differences.
- The outcomes of transition are limited by the structure of the MFP/NHTP dataset. Data on MFP are more detailed. Among those transitioned to the community through MFP,

54.1 percent were successfully discharged from the program after 365 days, which is the amount of time allowed in the program by design. Of those who were discharged prior to 365 days, the most frequent reason was due to death. About half of the transitions occurring through the MFP program have a successful discharge after a year of program engagement (when the MFP benefits end). The characteristics of those with successful MFP transitions tend to be younger, placed in independent housing or assisted living, and are slightly more likely to have received a housing supplement as compared to those who were discharged earlier.

- Just over half of those in NHTP (52.1 percent) were transferred to a case management agency following transition. This is the only detail on the disposition of NHTP transitions available in the data.
- There is no long-term follow up to understand whether individuals who transition through NHTP or MFP return to a nursing facility. This analysis may be feasible by linking MFP and NHTP data to MDS assessments, however, this type of analysis was outside the scope of this project.

Program and Policy Implications

- While the MFP grant will continue in operation until December 2018, the state should begin to explore now what model is the best fit for the state as part of its strategy to rebalancing the LTSS delivery system from institutional settings to HCBS going forward.
- Accessible and affordable housing will continue to be an issue the state will need to grapple with in order to promote both nursing home transition and diversion.
- Development of data protocols, data collection tools, and training of staff will align data collection and improve overall quality of the data collected across transition programs, including program outcomes and quality of life.
- Building off of the improvements to the data infrastructure, development of a continuous quality improvement effort with regular (possibly monthly) reporting to EOHHS and providers of key metrics will reflect progress toward goals. A state-level dashboard should be created to present data on transitions.

Introduction

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- Environmental scan to understand Rhode Island’s current policies and activities around rebalancing the system and other states’ mechanisms for change, activities, and impact
- Focused data analyses to identify precipitating factors for individuals in need of or receiving LTSS in Rhode Island (including the “Pre-Medicaid” population and those already enrolled in Medicaid) and to provide data related to the recommendations
- Engagement of stakeholders (e.g., consumers, advocates, providers, policymakers) as key contributors to the development of the initial and refined actions, activities, and policies

This report details findings from the data analyses in which EOHHS sought to gain a better understand of both the events and circumstances that precede and immediately follow entry into LTSS for three key populations:

1. The “pre-Medicaid” population (those not enrolled in Medicaid prior to using LTSS),
2. The Medicaid-enrolled population, and
3. Nursing facility residents referred for transition back to the community.

The Lewin team performed claims and administrative data analysis to explore the characteristics of these three populations and their experience with LTSS in Rhode Island through analyses of two data sources:

- *HealthFacts RI*, the state’s All-Payer Claims Database (APCD): Rhode Island’s APCD vendor, OnPoint, supplied the APCD data which included commercial, Medicaid (fee-for-service and managed care), and Medicare (traditional and Medicare Advantage) claims from participating entities with claims submitted beginning in 2011.
- *Money Follows the Person/Nursing Home Transition Program (MFP/NHTP) Dataset*: EOHHS maintains the MFP/NHTP, which is an administrative dataset. Both MFP and NHTP were designed to support nursing home residents to transition back into the community with necessary supports to experience more independence. NHTP was implemented in Rhode Island in 2009. Individuals identified for community transition through NHTP receive a limited case management benefit. MFP, also referred to *The Rhode to Home*, is a demonstration grant program with an enhanced federal match to state dollars for home- and community-based services (HCBS) initiated in November 2011. MFP participants receive case management and other transition services for 365 days following the date of transition. Whereas the primary eligibility criterion for NHTP is Medicaid enrollment, MFP has more stringent eligibility criteria: 1) Medicaid enrollment, 2) residing in a nursing facility for a minimum of 90 days, and 3) the individual must move to a qualified community residence.

Results of our analyses are organized around the data sources applied. The pre-Medicaid and Medicaid populations using LTSS are evaluated using the APCD and the nursing home transition population is evaluated using the MFP/NHTP data. The report concludes with discussion and program/policy implications and limitations of the analyses. Several Appendices provide detailed results to support the report narrative.

Key Analytic Questions

The key questions outlined below resulted from consultation with EOHHS and an assessment of the feasibility given the variables available in the respective datasets.

APCD

1. What demographic, clinical, and other characteristics of the population, regardless of insurance coverage, appear associated with LTSS use?
2. What factors predict entry into LTSS, specifically for those not enrolled in Medicaid prior to their entry into LTSS (pre-Medicaid population)?
 - a. Do differences exist in the characteristics of those who first enter a NF vs. those who first access LTSS in the home/community (HCBS) (e.g., demographic, clinical, prior utilization)?
 - b. Do the predictive characteristics differ based on age of the individual (<65, 65-79, 80+)?
 - c. Can we identify specific precipitating events (e.g., hospitalization, illness, accident) coincident with or present just before entry into LTSS? Do they differ by type of LTSS first utilized?
3. What factors predict entry into LTSS specifically for those already Medicaid eligible at the time of entry into LTSS?
 - a. Do differences exist in the characteristics of those who first enter a NF vs. those who first access LTSS in the home/community (HCBS)?
 - b. Do these patterns of characteristics vary by age?
 - c. Can we identify specific precipitating events (e.g., hospitalization, illness, accident) coincident with or present just before entry into LTSS? Do they differ by type of LTSS first utilized?

MFP/NHTP

1. How many people received a referral to transition back to the community from a NF? How many receive a referral, but do not transition? What individual characteristics appear associated with a referral?
2. How long does it take from referral to transition among those who transitioned back to the community?
3. What can we learn from the data regarding the outcomes of MFP/NHTP?
4. Compared to pre-transition status, how do key aspects of MFP participants' quality of life change after one and two years of community living? Prior research on a small number of MFP participants revealed that quality of life improves upon transition to the community and is sustained after two years of community living (Irvin et al. 2013). We will attempt to replicate this analysis using the Quality of Life survey data to examine whether MFP

participants demonstrate substantial improvements in quality of life after one to two years of living in the community, as past research indicated.

Methods

[Appendix A](#) provides detailed methods for each respective analysis.

APCD

Rhode Island’s APCD vendor, OnPoint, supplied the data analyzed for the APCD research questions. This dataset includes commercial, Medicaid (fee-for-service and managed care), and Medicare (traditional and Medicare Advantage) claims from participating entities beginning with claims from 2011. For our analyses, we utilized member-level de-identified claims data from CY 2012 and 2013. The LTSS population was identified based on CY 2013 claims, using a series of codes derived from standard claim data elements, including procedure codes, revenue codes, and type of bill. This approach was used to provide a consistent definition applied across the multiple data contributors that submit data to the APCD. Lewin created an “incident” LTSS user dataset by identifying those individuals who initiated LTSS in CY 2013 and had no LTSS experience for at least 90 days prior to the date of the first LTSS claim in the data. LTSS utilization categories included:

1. Facility-based LTSS first, followed by HCBS use;
2. Facility-based LTSS use only;
3. HCBS first, following by facility-based LTSS; and
4. HCBS use only.

Facility-based LTSS reflects primarily nursing facility care, although a small proportion of claims indicated intermediate care facilities (ICFs) use. HCBS services include Adult Day services, assisted living, care management, foster care, habilitation, home delivered meals, home health, homemaker services, hospice, private duty nursing, respite, therapy, and transportation. [Appendix A](#) provides more details on the APCD information relied upon to define LTSS use.

Additional variables describing demographic characteristics (age, gender), insurance enrollment immediately prior to LTSS use (Medicare, Medicaid, Medicare/Medicaid (dual eligible), and commercial), clinical characteristics (using 16 diagnostic groupings), and service utilization in the 30 days prior to LTSS entry were captured and summarized from the data for the population using both CY 2012 and CY 2013 data. The Lewin team conducted descriptive univariate and bivariate analyses of this data, profiling LTSS users characteristics by their patterns of LTSS use.

In addition, Lewin conducted multivariate logistic regressions to understand better the “pre-Medicaid” population, i.e., those not enrolled in Medicaid in at least the 90 days prior to entry to LTSS separately from those already enrolled in Medicaid prior to LTSS entry. The predictive models were evaluated overall and also stratified by age group (<65, 65-79, and 80 and older) to understand if the patterns of predictors might vary by age group. Lewin also produced analyses to evaluate the “conversion” from Medicare- or commercial-only insurance enrollment to dual eligible status (Medicare/Medicaid) or Medicaid-only enrollment following admission to facility-based LTSS.

MFP/NHTP

The Money Follows the Person/Nursing Home Transition Program (MFP/NHTP) analysis used administrative data maintained by RI EOHSS. The database contains demographic, referral, and transition information for individuals referred for community placement from institutional care through NHTP or MFP between January 2010 and July 2016. The data provided to Lewin represented referrals, rather than unique individuals. As a result, the demographic characteristics (age, gender), location prior to NF entry, transition status (transitioned, not transitioned), post-transition housing status, and outcomes of the transition process, including quality of life survey (QoL) measures reflect referrals rather than unique individuals. To support interpretation of the data, we also evaluated the number of unique individuals that the referrals and transitions represent. The Lewin team conducted descriptive analyses to understand the characteristics of the NF transition referrals made over the study time period and their outcomes by program (MFP or NHTP).

Results

APCD

The CY 2013 APCD data file contains claims for a total of 604,671 unique individuals, reflecting 6.8 million member-months. **Table 1** presents a breakdown of the total population and the LTSS user population by insurance status.

Table 1. Total Unique Members in the APCD by Insurance Type, CY 2013

Enrollment Status	Medicare Only	Medicaid Only	Medicare and Medicaid	Commercial Only	Total
Total Unique Members in APCD	155,637	82,656	36,805	329,573	604,671
Percent of Total (%)	25.7%	13.7%	6.1%	54.5%	100.0%
Total Unique LTSS Users	23,923	7,323	5,371	12,206	48,823
Percent of Insurance Type (%)	15.4%	8.9%	14.6%	3.7%	8.1%

One-quarter of the APCD population were enrolled in Medicare and just over half (54.5 percent) were commercially insured. Medicaid comprised almost 14 percent of the population and those dually eligible for Medicare and Medicaid made up 6.1 percent of the population. In total, we identified 48,823 individuals who used LTSS in CY 2013, which reflects 8.1 percent of the total unique members in the APCD. The LTSS population made up 15.4 percent of those enrolled in Medicare only. In contrast, the LTSS population enrolled in commercial insurance made up only 3.7 percent of the population.

Table 2 profiles the demographic and clinical characteristics of LTSS users age 21 and older in Rhode Island in CY 2013.

Table 2. Characteristics of LTSS Users, CY 2013

Characteristic	Facility First	Facility Only	HCBS First	HCBS Only	Total
Beneficiaries	1,243	530	3,375	43,675	48,823
Mean Age (SD)	78.3 (10.9)	81.2 (13.3)	80.2 (10.6)	61.8 (18.9)	63.7 (19.1)
< 65	10%	10%	9%	51%	47%
65-79	37%	18%	28%	27%	27%
80+	53%	72%	64%	22%	26%
Female (%)	63%	71%	64%	58%	59%
Enrollment Status Prior to LTSS Entry					
Medicare	78%	56%	82%	45%	49%
Medicaid	4%	11%	3%	16%	15%
Medicare and Medicaid	14%	28%	13%	11%	11%
Commercial	4%	6%	2%	28%	25%
Disease Prevalence					
Mean Co-Morbid Conditions (SD)	3.68 (1.96)	3.13 (1.84)	3.21 (2.00)	2.30 (1.85)	2.68 (1.90)
Injury	22%	13%	18%	17%	17%
Cancer	22%	9%	20%	17%	17%

Characteristic	Facility First	Facility Only	HCBS First	HCBS Only	Total
Diabetes	25%	16%	25%	19%	20%
Anemia	16%	15%	15%	8%	8%
Dementia & Delirium	16%	47%	11%	3%	4%
Mood Disorders	10%	14%	8%	14%	13%
Nervous System Conditions	3%	4%	4%	2%	2%
Eye Disorders	29%	24%	32%	21%	22%
Hypertension	53%	46%	48%	34%	35%
Heart Disease / Heart Failure	48%	28%	42%	27%	29%
Cerebrovascular Disease	9%	7%	8%	4%	4%
Arterial Disease	28%	48%	28%	11%	13%
COPD	12%	5%	13%	8%	8%
Asthma	4%	1%	4%	4%	4%
Respiratory	32%	20%	25%	23%	23%
Non-Traumatic Joint Disorders	41%	15%	22%	19%	19%

* Count of co-morbid conditions based on the 16 diagnosis groups in [Appendix A.2](#).

Based on our definitions of LTSS use and patterns of use over CY 2013, the largest proportion of the total LTSS population represented those who only accessed HCBS, reflecting 89.5 percent of the entire sample. The next largest group was that which used HCBS first, but later entered a facility (6.9 percent). Those who used a facility first and later used HCBS comprised 2.5 percent of the total sample and those who only used facility-based LTSS during CY 2013 comprised 1.1 percent of the total sample.

The LTSS population is primarily a Medicare-enrolled population; 49 percent were enrolled in Medicare only prior to LTSS entry and another 11 percent were dually eligible for Medicare and Medicaid. In total, 15 percent of the LTSS population was enrolled in Medicaid only and 25 percent were commercially insured prior to LTSS use. The average LTSS user was almost 64 years old. However, upon examination of the specific types of users, those who had any use of a facility (whether used first, alone, or after use of HCBS) were much closer to 80 years old. Across the board, LTSS users were more likely to be female (59 percent) with women constituting approximately 71 percent of those who used a facility only.

On average, those who used a facility first had more co-morbid disease than did other LTSS users. The most prevalent conditions in this group were heart disease/heart failure and non-traumatic joint disorders. In contrast, the most prevalent conditions among those who used only a facility were dementia and delirium along with arterial disease. Those who used HCBS only were qualitatively different on just about every metric used to describe the population. They were generally younger, more likely to be male, and more likely to have commercial insurance than other LTSS user groups. They also had less co-morbid disease overall; the most prevalent condition in this group was hypertension.

Table 3 shows LTSS service utilization per beneficiary overall and by type of LTSS user type. The utilization rates in the table are calculated as total utilization divided by the population overall or in the specific category of LTSS use. This table does not distinguish utilization by payer.

Service utilization paid by another source (e.g., the Veterans Health Administration, private pay, or other insurance not included in the APCD) is not reflected in this table.

Table 3. LTSS Utilization per Beneficiary by LTSS User Type, CY 2013

Characteristic	Facility First	Facility Only	HCBS First	HCBS Only	Total
Beneficiaries (N)	1,243	530	3,375	43,675	48,823
Nursing Facility (days)	61.09	94.52	55.78	0.00	6.43
Adult Day (days)	0.45	0.00	0.54	0.88	0.84
Assisted Living (days)	0.51	0.00	1.21	0.38	0.44
Care Management (units)	0.30	0.00	0.79	0.66	0.65
Foster Care (days)	0.00	0.00	0.00	0.00	0.00
Habilitation (days)	0.00	0.00	0.00	1.31	1.17
Home Delivered Meals (meals or deliveries)	0.00	0.00	0.11	0.05	0.05
Home Health (visits)	4.22	0.00	8.19	1.94	2.41
Homemaker Services (units)	0.00	0.00	0.80	0.41	0.43
Hospice (days)*	94.53	0.00	101.88	24.45	31.32
Private Duty Nursing (quantity)	11.66	0.00	16.41	6.27	7.04
Personal Care (quantity)	7.85	0.00	25.82	10.34	11.23
Respite (days)	0.00	0.00	0.00	0.08	0.07
Therapy (units)	24.47	0.00	26.30	12.81	13.90
Training (units)	0.09	0.00	0.51	0.11	0.15
Transportation (miles or trips)	7.35	0.00	12.95	4.47	5.68

Note: Utilization rate calculation derived from total claims in selected service category divided by population (total or LTSS utilization group).

* Hospice care is only identified among those who had any HCBS use; hospice use in the facility was differentiated from facility use for this analysis.

Nursing facility use was highest among those who entered a facility first or for whom a facility was their only LTSS use in CY 2013. Interestingly, even those who entered HCBS first also used facility-based LTSS for almost the same length of time as those who entered a facility first. Among those who used a facility first and those who used HCBS first, rates of therapy use in the community were nearly identical. However, those who used HCBS first had greater use of home health, private duty nursing, personal care, and transportation services as compared to those who used a facility first. Differences in total service utilization among those who used facility-based LTSS first compared to those who used HCBS first may be a function of censoring in the data as we only followed LTSS use through the end of CY 2013. Almost one-quarter of the population (N=11,414, 23.4 percent) continued to receive LTSS in December 2013, suggesting that LTSS episodes are censored for a sizeable group of individuals in these analyses. The group using HCBS only had moderate levels of private duty nursing, personal care and therapy compared to others. Hospice use was fairly high among those who used HCBS; use rates among those who were HCBS only were much lower than for those who used a facility first or HCBS first. Habilitation services appeared only among those who only accessed HCBS services.

Table 4 presents utilization by payer source for those new to LTSS in CY 2013. The count of beneficiaries in this table differs from other tables because these individuals can have multiple

types of insurance during the year and are therefore counted more than once. Just as in **Table 3**, utilization rates in **Table 4** are computed using the specific payer source or the entire population as the denominator, as was appropriate.

Table 4. LTSS Utilization per Beneficiary by Payer, CY 2013

Utilization Metric	Medicare	Medicaid	Commercial	Total
Beneficiaries (N)	32,526	14,933	16,128	63,587
Nursing Facility (days)	6.92	13.09	0.32	6.63
Adult Day (days)	0.00	3.66	0.00	0.86
Assisted Living (days)	0.00	1.92	0.00	0.45
Care Management (units)	0.61	1.53	0.02	0.67
Foster Care (days)	0.00	0.00	0.00	0.00
Habilitation (days)	0.00	5.13	0.00	1.21
Home Delivered Meals (meals or deliveries)	0.00	0.23	0.00	0.05
Home Health (visits)	3.54	0.40	2.32	2.48
Homemaker Services (units)	0.00	1.86	0.00	0.44
Hospice (days)*	63.69	1.18	0.17	32.29
Private Duty Nursing (quantity)	11.60	1.61	4.03	7.26
Personal Care (quantity)	0.00	48.11	0.99	11.58
Respite (days)	0.00	0.32	0.00	0.08
Therapy (units)	18.25	4.65	15.50	14.33
Training (units)	0.18	0.05	0.14	0.52
Transportation (miles or trips)	4.90	8.30	3.16	5.24

Note: Utilization rate calculation derived from total claims in selected service category divided by population (total or payer type).

About twice as many nursing facility days on average were paid by Medicaid as compared to Medicare. Commercial insurance paid for very little nursing facility care. The smaller overall number of nursing facility days in this table as compared to those in **Table 3** can be understood as a function of the larger number of individuals with LTSS claims paid and the calculation of mean days per beneficiary is across all who used any LTSS, not just those who used nursing facilities. Medicaid was the sole payer for adult day services, assisted living, habilitation, home delivered meals, homemaker services, and respite services. These are services that are generally covered under the waiver in Rhode Island or would have otherwise been covered by private pay. Medicare generally does not cover these services, nor does commercial insurance typically. Medicare was the dominant payer of home health services, hospice, private duty nursing, and therapy (although commercial insurance also paid for a large amount of therapy, as well).

Table 5 details spending and service utilization patterns among those who used LTSS, profiled by their LTSS use category. Analyses similar to those in **Table 5** were performed stratified by insurance enrollment status prior to LTSS use, these are included in [Appendix B](#). The Appendix B table describe service use and spending profiled by Medicare-only enrollment, Medicaid-only enrollment, Medicare and Medicaid enrollment (dual eligibles), commercial insurance enrollment, and for each age group (<65, 65-79, and 80+).

Table 5. Service Utilization and Spending in the 30 Days Prior to LTSS Entry

	Facility First	Facility Only	HCBS First	HCBS Only	Total
Beneficiaries	1,243	530	3,375	43,675	48,823
Total Expenditures (000s)	\$15,579	\$722	\$5,906	\$135,167	\$157,373
Expenditures Per Beneficiary	\$12,533	\$1,361	\$1,750	\$3,095	\$3,223
Inpatient Utilization					
0 Inpatient Admissions (%)	35%	95%	91%	88%	87%
1 Inpatient Admission (%)	52%	4%	7%	10%	11%
2+ Inpatient Admissions (%)	13%	1%	2%	2%	2%
Mean Inpatient Bed Days (SD)	6.8 (4.7)	8.6 (6.0)	7.2 (5.8)	6.0 (4.5)	6.1 (4.6)
Total Inpatient Expenditures (000s)	\$13,188	\$300	\$3,509	\$88,883	\$105,880
Mean Inpatient Expenditures (SD)	\$16,282 (\$12,002)	\$13,623 (\$15,163)	\$12,225 (\$12,728)	\$17,363 (\$16,979)	\$16,973 (\$16,270)
ER Utilization					
0 ER Visits (%)	95%	98%	94%	91%	91%
1 ER Visit (%)	4%	1%	4%	7%	7%
2+ ER Visits	1%	0%	1%	2%	2%
Total ER Expenditures (000s)	\$74	\$8	\$198	\$4,536	\$4,816
Mean ER Expenditures (SD)	\$268 (\$556)	\$805 (\$731)	\$566 (\$867)	\$849 (\$1409)	\$805 (\$1361)
ER and Inpatient Stay (%)	22%	2%	5%	5%	6%
Any Outpatient Use (%)	47%	6%	28%	29%	29%
Total Outpatient Expenditures (000s)	\$210	\$7	\$687	\$14,796	\$15,700
Mean Outpatient Expenditures (SD)	\$360 (\$741)	\$210 (\$375)	\$715 (\$2,315)	\$1,168 (\$3,458)	\$1,102 (\$3,325)
Any Primary Care Visits (%)	52%	6%	36%	35%	36%
Total Primary Care Expenditures (000s)	\$232	\$5	\$246	\$3,415	\$3,897
Mean Primary Care Expenditures (SD)	\$356 (\$378)	\$155 (\$163)	\$203 (\$458)	\$221 (\$506)	\$225 (\$499)
Any Specialty Provider Visits (%)	67%	8%	38%	33%	34%
Total Specialty Provider Expenditures (000s)	\$1,144	\$23	\$536	\$10,871	\$12,573
Mean Specialty Provider Expenditures (SD)	\$1,381 (\$1,093)	\$553 (\$1,319)	\$418 (\$740)	\$752 (\$1,516)	\$757 (\$1,461)
Any DME (%)	9%	2%	12%	8%	9%
Total DME Expenditures (000s)	\$14	\$2	\$81	\$728	\$825
Mean DME Expenditures (SD)	\$133 (\$151)	\$171 (\$107)	\$207 (\$1170)	\$196 (\$746)	\$196 (\$785)
Any Other Utilization (%)	84%	69%	57%	56%	57%
Total Other Expenditures (000s)	\$718	\$377	\$650	\$11,938	\$13,681
Mean Other Expenditures (SD)	\$687 (\$1,628)	\$1032 (\$1,916)	\$336 (\$805)	\$484 (\$1,240)	\$488 (\$1,245)

While total spending was highest for the group that only used HCBS, average spending was actually highest among those who used facility-based LTSS first, followed by HCBS. We observed that average total spending was highest among those who used facility-based LTSS first across all payers, including Medicaid (see [Appendix B](#)). Their greater likelihood of using inpatient services in the 30 days prior nursing facility admission drives much of this group's higher spending. Further contributing to the higher expenditures among those who used facility-based LTSS first is the greater prevalence of both emergency room services and inpatient admissions use in the 30 days prior to LTSS use. Approximately 22 percent of those who used a facility first had both an emergency room visit and an inpatient admission in the 30 days prior to their nursing facility admission as compared to less than 5 percent of those in the other LTSS use categories. Among those who used inpatient services, length of stay differed by less than two days on average across LTSS use category. Those who used facility-based LTSS first were also more likely to have had outpatient care, primary care visits, and specialty care visits as compared to the other LTSS use categories. Primary and specialty care spending was also higher on average per person in the facility-first group as compared to others.

Notably, the vast majority of the facility-only LTSS users did not use any acute care services immediately prior to entering the facility; only 5 percent had an inpatient admission in the prior 30 days. Among dual eligibles, only 2 percent had an inpatient admission in the 30 days prior to their facility admission. This is in contrast to approximately 65 percent of those who entered a facility first, followed by HCBS who, on average, had one or more inpatient admissions in the 30 days prior to facility admission. We cannot be certain that those who only used facility-based LTSS entered the facility directly from the community. Some of the individuals in this group may have already been in the facility but paid for out-of-pocket or by other insurance coverage not captured in the APCD. We cannot estimate the proportion that were private pay with the current data.

Table 6 displays the results of a logistic regression to evaluate the risk factors associated with using facility-based LTSS (first or only) compared HCBS (first or only) among those enrolled in Medicare alone (not dual eligible, N=23,923) or in commercial insurance (N=12,206). Odds ratios are presented, with their 95% confidence intervals, for each of the demographic characteristics (age, gender), insurance enrollment (commercial insurance as compared to Medicare), clinical conditions (total count and prevalence of any of the 16 conditions included in this analysis), and service utilization measures. Odds ratios greater than one suggest the characteristic of interest is associated with a higher risk of facility entry as compared to HCBS entry and odds ratios less than one suggest the characteristic is “protective” or associated with a lower risk of facility entry as compared to HCBS entry. Confidence intervals that cross 1.0 indicate that the measure of interest is not significantly associated with the outcome.

Table 6. Predictors of LTSS Entry (Facility-Based vs. HCBS) for the Medicare-Only and Commercially Insured Populations Using LTSS in Rhode Island, CY 2013

Variable	Odds Ratio	95% Confidence Interval	
Female	1.179	1.038	1.339
Age < 65	0.394	0.292	0.532
Age >= 80	1.728	1.504	1.985
Commercial Only Insurance	0.186	0.130	0.267
Number of Comorbid Conditions	0.989	0.964	1.015
Cancer	0.778	0.661	0.916
Diabetes	1.062	0.910	1.239
Anemia	1.188	0.997	1.416
Dementia & Delirium	5.055	4.234	6.035
Mood Disorders	1.553	1.251	1.929
Nervous System Conditions	1.212	0.870	1.688
Eye Disorders	0.903	0.784	1.039
Hypertension	1.112	0.975	1.268
Cerebrovascular Disease	0.975	0.777	1.223
Arterial Disease	1.534	1.325	1.774
Respiratory Infections/Disease	1.028	0.880	1.202
Chronic Obstructive Pulmonary Disease	0.997	0.804	1.236
Asthma	1.052	0.745	1.485
Non-Traumatic Joint Disorders	1.575	1.365	1.818
Injury	1.113	0.946	1.310
1+ Inpatient Admissions Only/No ER (30 Day)	21.443	17.809	25.818
1+ ER Visits Only/No Inpatient (30 Day)	0.828	0.529	1.298
1+ ER Visits and Inpatient Admissions (30 Day)	12.287	9.900	15.251
1+ Primary Care Visits (30 Day)	1.030	0.889	1.194
1+ Specialty Care Visits (30 Day)	0.491	0.425	0.567
1+ DME Claims (30 Day)	0.766	0.649	0.903

Note: Odds ratios reflect risk of nursing facility use (first or only) compared to HCBS use (first or only).

* Reference groups: gender: male; age category: 65-79; commercial insurance: Medicare; diagnosis groups reflect presence of condition versus no presence of condition; service utilization measures reflect 1+ claims in service category versus no claims in 30 days prior to LTSS entry.

Among the Medicare and commercially-insured populations, women, persons 80 years of age or older (as compared to those age 65-79), and those with dementia/delirium, mood disorders, arterial disease, and non-traumatic joint disorders were significantly more likely to use facility-based LTSS (either first or only) than HCBS (first or only). Persons less than age 65 (as compared to those age 65-79), those with commercial insurance (as compared to Medicare coverage), and those with cancer were less likely to use facility-based LTSS.

Also included in this model were measures of any service utilization in the inpatient setting, emergency room, primary care, specialty care, and DME. All measures of service utilization reflect those who had expenditures for those services greater than \$0 in the 30 days prior to the

start of LTSS use. In this model, the overwhelming driver of facility-based LTSS compared to HCBS use was inpatient use. Those who had one or more inpatient admissions in the 30 days prior to LTSS use were 21.4 times more likely to have entered a facility as compared to HCBS. Those who had both an ER visit and an inpatient admission in the 30 days prior to LTSS use were also significantly more likely to enter a facility, although the odds of doing so were just over half compared to those who had only inpatient admissions. Interestingly, any use of specialty care in the 30 days prior to LTSS use was associated with a reduced risk of entering a facility. In addition, use of DME was associated with a reduced odds of facility use compared to HCBS.

Lewin conducted similar analyses to those presented above replacing any service use with total spending in each service category. While the patterns of association were similar for demographic, insurance enrollment, and clinical characteristics, total spending had a small effect on the risk of using a facility rather than HCBS. The complete output for these analyses can be found in [Appendix C](#). In summary, inpatient, emergency room, outpatient, specialty care, and DME spending had significant associations with the risk of using facility-based LTSS first or only compared to using HCBS first or only. The influence of spending is much more attenuated than is observed using the measures of any service use. For example, a \$1,000 increase in inpatient spending is associated with a 5 percent increase in the risk of using facility-based LTSS use. A \$100 increase in emergency room spending is associated with a 3.1 percent decrease in the risk of facility-based LTSS use. A \$100 increase in specialty physician spending was associated with a 1.6 percent increase in the risk of facility-based LTSS use. This last finding seems to contradict the finding in **Table 6**, which reports that specialty care was protective against facility-based LTSS use. In this regard, the spending data may be a more sensitive measure of acuity of need in the population where those who have higher specialty provider spending reflect higher clinical acuity and for which a facility admission may be the more appropriate protocol to address their needs.

To better understand whether different factors are predictive of facility use as compared to HCBS by age, we stratified our analyses by age group (see [Appendix D](#) for the associated output). Overall, we observed similar patterns of association for commercial insurance, dementia and delirium, arterial disease, and non-traumatic joint disorders. In addition, inpatient use and both emergency room and inpatient use in the thirty days prior to LTSS use were also significant and highly predictive of facility use. Among those under age 65, anemia and nervous system disorders were significantly and positively associated with the risk of using facility-based care relative to HCBS. Gender was not significantly associated with facility use relative to HCBS use among those under 65 and those 65 to 79 but it was a significant factor for those individuals age 80 and older. Women were 40 percent more likely to use a facility compared to men age 80 and over. As with the under 65 population, anemia was also a positive predictor of facility use in the population age 80 and older.

Table 7 evaluates the predictors of entry to facility-based LTSS (either first or only) as compared to HCBS (either first or only) for those who were enrolled in Medicaid alone (N=7,323) or were dually eligible for Medicare and Medicaid (N=5,371).

Table 7. Predictors of LTSS Entry (Facility-Based vs. HCBS) for the Medicaid-Eligible Population Using LTSS in Rhode Island, CY 2013

Characteristic	Odds Ratio	95% Confidence Interval	
Female	0.827	0.644	1.062
Age < 65	0.312	0.214	0.455
Age >= 80	3.377	2.473	4.612
Medicare and Medicaid Enrollment	1.023	0.745	1.405
Number of Comorbid Conditions	1.040	0.990	1.093
Cancer	0.665	0.448	0.986
Diabetes	1.169	0.872	1.568
Anemia	1.069	0.732	1.559
Dementia & Delirium	10.129	7.421	13.827
Mood Disorders	0.766	0.547	1.073
Nervous System Conditions	1.566	0.779	3.146
Eye Disorders	0.785	0.591	1.043
Hypertension	0.818	0.629	1.062
Cerebrovascular Disease	1.027	0.647	1.628
Arterial Disease	1.852	1.366	2.510
Respiratory Infections/Disease	0.937	0.691	1.272
Chronic Obstructive Pulmonary Disease	1.047	0.692	1.585
Asthma	0.365	0.167	0.799
Non-Traumatic Joint Disorders	1.197	0.882	1.623
Injury	0.792	0.560	1.119
1+ Inpatient Admissions Only/No ER (30 Day)	17.872	11.870	26.911
1+ ER Visits Only/No Inpatient (30 Day)	0.325	0.140	0.755
1+ ER Visits and Inpatient Admissions 30 (Day)	8.600	5.417	13.653
1+ Primary Care Visits (30 Day)	0.562	0.410	0.771
1+ Specialty Care Visits (30 Day)	0.487	0.352	0.672
1+ DME Claims (30 Day)	0.994	0.717	1.379

Note: Odds ratios reflect risk of nursing facility use (first or only) compared to HCBS use (first or only).

* Reference groups: gender: male; age category: 65-79; Medicare and Medicaid enrollment: Medicaid-only enrollment; diagnosis groups reflect presence of condition versus no presence of condition; service utilization measures reflect 1+ claims in service category versus no claims in 30 days prior to LTSS entry.

Many of the same associations described above in **Table 6** for the Medicare-only and commercially-insured populations can be observed in the model presented in **Table 7** for the Medicaid/dual eligible population. For example, patterns of risk by age group, cancer diagnosis, presence of dementia or delirium, and arterial disease are similar. Whereas diagnosis of anemia, mood disorders, and non-traumatic joint disorders were significantly associated with the type of LTSS used for those enrolled in Medicare or commercial insurance, they are not significant predictors of risk for facility-based LTSS use among those enrolled in Medicaid alone or enrolled in Medicare and Medicaid. Enrollment characteristics (either dually eligible for Medicare and

Medicaid or enrolled in Medicaid only) are not significantly associated with use of facility-based LTSS relative to HCBS.

Service use patterns are very similar in the Medicaid/dual-eligible analysis as compared to the Medicare/commercial insurance analysis. The risk of facility-based LTSS use (either first or only) among those who had one or more inpatient admissions was 17.9 times higher compared to those who had no inpatient admissions. Similarly, the risk of facility-based LTSS use was 8.6 times higher for those who had both an emergency room visit and an inpatient admission. Those with any emergency room visits only (with no inpatient admission) and primary care physician visits reduced the risk that the individual would enter a facility upon first use of LTSS. Those with any DME use were also less likely to use facility-based LTSS than HCBS. Specialty provider service use did not appear to be significantly associated with the outcome.

As discussed previously, Lewin also examined the association of total spending by service category with type of LTSS used. The complete SAS output for the model focused on the Medicaid and dual eligible populations can be found in [Appendix E](#). A \$1,000 increase in inpatient spending is associated with a 4.7 percent increase in the risk of using facility-based LTSS (either first or only) compared to HCBS use (either first or only). A \$100 increase in specialty provider spending was associated with a 4.6 percent increase in the risk of using facility-based LTSS compared to HCBS as well.

Review of the same analyses for the Medicaid and dual eligible populations stratified by age revealed some notable differences from those observed for the full Medicaid/dual sample (see [Appendix F](#) for output). In the under 65 population, female gender and mood disorder are negatively and significantly associated with facility use. Unlike in other models, any specialty care in this group is significantly associated with facility-based LTSS use. Service use patterns observed for this age group are similar to those observed in the full model. Among those age 80 and older, arterial disease is positively associated with facility-based LTSS use. Those with a diagnosis of delirium or dementia reflect the only diagnosis group positively associated with facility-based LTSS use among Medicaid and dually eligible individuals regardless of age.

Table 8 and **Table 9** present information for the “pre-Medicaid” population who subsequently enrolled in Medicaid following the start of LTSS use. For this analysis, we created a sub-sample of individuals who used facility-based LTSS (either first or only) and selected those who had no Medicaid enrollment for the 12 months prior to the first date of LTSS use in CY 2013 (see [Appendix A](#) for a full description of our methods). We identified a total of 131 out of 1,199 (10.9 percent) individuals who met the criteria for analysis who enrolled in Medicaid subsequent to LTSS entry. Of those who enrolled in Medicaid after initiating LTSS, 45.8 percent used facility-based LTSS only. In contrast, only 19.5 percent of those who did not convert to Medicaid eligibility used facility-based LTSS only.

Table 8 profiles the demographic and clinical characteristics of those who “converted” to Medicaid eligibility compared to those who did not. The study sample for this analysis was approximately 96 percent Medicare eligible but 99 percent of all conversions to Medicaid occurred for those who were Medicare-only prior to entering facility-based LTSS. Overall, the populations were not all that different however, the population that enrolled in Medicaid was slightly older and more likely to be female than the one that did not enroll in Medicaid. They also were much more likely to have had a diagnosis of dementia or delirium and slightly more likely to have arterial

disease as compared to the population who did not enroll in Medicaid after entry to facility-based LTSS. In contrast, those who did not enroll in Medicaid were more likely to have cancer, diabetes, mood disorders, heart disease/heart failure, respiratory conditions, and non-traumatic joint disorders.

Table 9 details the service utilization and spending in the 30 days prior to LTSS entry for those who subsequently enrolled in Medicaid and for those who did not enroll in Medicaid. Total spending in the 30 days before LTSS entry was substantially lower for those who converted to Medicaid eligibility as compared to those who did not. Those who converted were less likely to have any inpatient admissions prior to facility entry; 11 percent had one or more inpatient admissions in the 30 days prior to LTSS entry as compared to 63 percent of those who didn't convert to Medicaid. As noted earlier, we cannot be certain that those who only used facility-based LTSS entered the facility directly from the community. Some of the individuals in this group may have already been in the facility but paid for out-of-pocket or by other insurance coverage not captured in the APCD.

In previous analyses, we observed that those who used facility-based LTSS first used more specialty care providers (67 percent, see **Table 5**). Those who did not enroll in Medicaid after initiating LTSS use had similar rates of use of specialty services providers. Although more than half of those who enrolled in Medicaid after initiating LTSS entered a facility first and later used HCBS, their characteristics appear to be more similar to those who, in the larger study population used only facility-based LTSS.

Table 8. Characteristics of LTSS Users with Post-LTSS Medicaid Enrollment and No Medicaid Enrollment Prior to LTSS Use, CY 2013

Characteristic	Post-LTSS Medicaid	No Medicaid	Total
Beneficiaries	131	1,068	1,199
Age & Gender Distribution			
Mean Age (SD)	80.8 (12.3)	79.5 (9.6)	79.7 (9.9)
< 65	11%	5%	6%
65-79	20%	39%	37%
80+	69%	56%	58%
Female (%)	70%	63%	64%
Enrollment Status Prior to LTSS Entry			
Medicare	99%	96%	96%
Commercial	1%	4%	4%
Disease Prevalence			
Mean Co-Morbid Conditions (SD)	3.31(1.94)	3.77(1.89)	2.68 (1.90)
Injury	24%	21%	21%
Cancer	15%	24%	23%
Diabetes	15%	24%	23%
Anemia	13%	17%	16%
Dementia & Delirium	48%	16%	20%
Mood Disorders	5%	10%	10%
Nervous System Conditions	5%	4%	4%
Eye Disorders	27%	31%	30%
Hypertension	50%	57%	56%
Heart Disease / Heart Failure	40%	48%	47%
Cerebrovascular Disease	8%	8%	8%
Arterial Disease	39%	30%	31%
COPD	5%	10%	10%
Asthma	1%	4%	3%
Respiratory	22%	32%	31%
Non-Traumatic Joint Disorders	14%	41%	38%

Table 9. Service Utilization and Spending in the 30 Days Prior to LTSS Entry for LTSS Users with Post-LTSS Medicaid Enrollment and No Medicaid Enrollment Prior to LTSS Use, CY 2013

	Post-LTSS Medicaid	No Medicaid	Total
Beneficiaries	131	1068	1,199
Total Expenditures (000s)	\$538	\$12,904	\$13,442
Expenditures Per Member	\$4,109 (\$10,711)	\$12,082 (\$13,775)	\$11,211 (\$13,694)
Inpatient Utilization			
0 Inpatient Admissions (%)	79%	37%	41%
1 Inpatient Admission (%)	14%	55%	51%
2+ Inpatient Admissions (%)	7%	8%	8%
Mean Inpatient Bed Days (SD)	11.3 (6.7)	6.6 (4.2)	6.8 (4.5)
Total Inpatient Expenditures (000s)	\$449	\$10,985	\$11,434
Mean Inpatient Expenditures (SD)	\$16,636 (\$12,084)	\$16,299 (\$11,937)	\$16,312 (\$11,935)
ER Utilization			
0 ER Visits (%)	95%	96%	96%
1 ER Visit (%)	5%	4%	4%
2+ ER Visits	1%	0%	0%
Total ER Expenditures (000s)	\$6	\$62	\$68
Mean ER Expenditures (SD)	\$410 (\$455)	\$287 (\$621)	\$295 (\$611)
ER and Inpatient Stay (%)	8%	19%	18%
Any Outpatient Use (%)	11%	48%	44%
Total Outpatient Expenditures (000s)	\$12	\$171	\$183
Mean Outpatient Expenditures	\$769 (\$1836)	\$336 (\$684)	\$349 (\$741)
Any Primary Care Visits (%)	23%	50%	47%
Total Primary Care Expenditures (000s)	\$7	\$184	\$191
Mean Primary Care Expenditures	\$241 (\$237)	\$344 (\$350)	\$338 (\$345)
Any Specialty Provider Visits (%)	24%	65%	61%
Total Specialty Provider Expenditures (000s)	\$26	\$982	\$1,009
Mean Specialty Provider Expenditures (SD)	\$825 (\$757)	\$1,413 (\$1,118)	\$1,387 (\$1,111)
Any DME (%)	5%	8%	8%
Total DME Expenditures (000s)	\$2	\$11	\$13
Mean DME Expenditures (SD)	\$256 (\$225)	\$126 (\$135)	\$135 (\$144)
Any Other Utilization (%)	62%	86%	83%
Total Other Expenditures (000s)	\$36	\$508	\$544
Mean Other Expenditures (SD)	\$448 (\$966)	\$553 (\$1555)	\$544 (\$1516)

MFP/NHTP

Table 10 describes the transition status of referrals, as of July 2016. Breaking out referral status by program proved complex (e.g., MFP, NHTP); individuals who receive referrals from one program may actually transition through the other program. Individuals may be referred by one program for transition, but another program may determine their candidacy for transition and actually perform the transition.

Table 10. Transition Status of Referrals (N=2,749)

Referral Status	Percentage
Referrals resulting in transition	24.9%
Referrals not resulting in transition	68.7%
Referrals still in process	4.9%
Ambiguous	1.5%

Overall, there were 2,749 referrals made over the study period (2011-2016), reflecting 2,411 unique individuals. A total of 284 individuals had 2 or more referrals to transition to a nursing facility and approximately 45.4 percent of these individuals did eventually transition to the community from a referral. The unit of analysis for all data presentations below is the referral, rather than individual.

As of July 2016, 684 out of 2,749 (24.9 percent) referrals resulted in community transition. Most referrals did not result in a transition (68.7 percent) and another 4.9 percent were still in process. A small number (1.5 percent) of all referrals had both a “transition placement” status and a “not a candidate for transition” status and were classified as “ambiguous”.

Table 11 presents the characteristics of NF transition referrals overall and by referring entity. While MFP or NHTP may have been the referring program for someone to transition to the community from a facility, it is not necessarily the case that the same program actually supported the individual in their transition. The “other” referral category includes those referred via the Office of Medical Review and other referrals not otherwise specified. Lewin was unable to obtain any additional information for these unclassified referrals.

Table 11. Characteristics of the Nursing Home Population Referred for Transition to the Community (N=2,749)

Characteristic	Total (N=2,749)	Referred by MFP (N=604)	Referred by NHTP (N=1,856)	Referred by Other* (N=289)
Female (%)	57.0%	54.1%	57.1%	61.8%
Age Group †				
< 65 years (%)	36.5%	40.1%	38.2%	17.4%
65-74 years (%)	21.4%	23.6%	21.3%	17.4%
75+ years (%)	42.1%	36.3%	40.5%	65.2%
Location Prior to NH Admission †				
Hospital (%)	80.4%	78.5%	85.2%	52.9%
Rehabilitation Facility (%)	3.8%	6.0%	3.4%	1.4%
Other/Missing (%)	15.9%	15.6%	11.4%	45.7%
Identified for Transition Placement (%)**	26.6%	32.5%	25.3%	23.8%
†				
Median Days from NH Admission to Referral Assessment*** †	54 Days	190 Days	38 Days	31 Days

* The “Other” category includes individuals referred by the Office of Medical Review or who were otherwise not identified as having been referred by either MFP or NHTP.

** Percent transitioned does not include referrals which are either still in process (n=135) or ambiguous (n=41).

*** Admissions to nursing facilities before January 1st 2010 were excluded from the calculation.

† Indicates significant difference at $\alpha = .05$.

NF residents referred by MFP and NHTP share a similar gender and age profile, though “Other” referrals are older on average (65.2 percent age 75+ as compared to 42.1 percent overall). Nursing home admissions originated from similar locations for those referred by MFP and NHTP, with the majority of nursing home admissions referred for transition coming from the hospital. MFP referrals were slightly more successful than other types of referrals in leading to transition placement (32.5 percent vs. 26.6 percent overall). The time from NF admission to assessment for referral was substantially longer for referrals that came from MFP (190 days vs. 54 days), which conforms with MFP policy that an individual must be a NF resident for at least 90 days before they are eligible for transition.¹

Table 12 presents data similar to **Table 11** but only for referrals that did not end in transition.

¹ The original eligibility criteria include the requirement that a resident be in a NF for at least 180 days paid for by Medicaid but this requirement was relaxed to 90 days by the Affordable Care Act.

Table 12. Characteristics of the Population Referred for Transition to the Community but Were Not Eligible for Transition

Characteristic	Total (N=1,889)
Female (%)	56.9%
Age Group	
< 65 (%)	35.9%
65-74 (%)	19.9%
75+ (%)	44.2%
Location Prior to NH Admission	
Hospital (%)	81.3%
Rehabilitation Facility (%)	3.0%
Other/Missing (%)	15.0%
Median Days from NH Admission to Referral Assessment*	46 Days

* Admissions to nursing facilities before January 1st 2010 were excluded from the calculation.

The characteristics of those who had referrals that did not result in a transition from the nursing facility were similar in many respects to those who did transition through either MFP or NHTP (see **Table 13** for comparison) based on demographic characteristics. Those who didn't transition were more likely to be in the oldest age group (75+) as compared to those who transitioned through MFP.

Table 13 examines referrals that resulted in a transfer to the community more closely, comparing transitions by program and overall.

Table 13. Transition Experience Among Referrals Transitioned to the Community

Characteristic	Total (N=684)	Transition by MFP (N=220)	Transition by NHTP (N=464)
Female (%) †	59.0%	52.7%	62.0%
Age Group †			
< 65 (%)	34.5%	36.8%	33.4%
65-74 (%)	24.9%	29.6%	22.6%
75+ (%)	40.6%	33.6%	44.0%
Median Days from Referral Assessment to Transition to the Community †	49 Days	72 Days	40 Days
Type of Housing Post-Transition			
Home – Personal (%)	11.5%	13.2%	9.9%*
Home – Family (%)	13.4%	15.5%	11.6%*
Leased Apartment (%)	45.2%	50.0%	40.9%*
Assisted Living (%)	22.3%	21.4%	23.1%*
Other/Missing (%)	7.6%	--	14.5%*
Housing Supplement Received (%) †	18.4%	29.1%	8.7%*
Living with Family Members (%)	30.5%	35.5%	26.0%*

* Data collection for these measures initiated 11/2011 with the start of MFP; 47.8 percent (n=222) of NHTP referrals do not link to these variables. Analyses of these measures for NHTP are based on the 242 referrals that transitioned to the community following 11/2011.

† Indicates significant difference at $\alpha = .05$.

The 684 transitions reflect 667 unique individuals. There were 16 individuals in our data who experienced more than 1 transition during the study time period (data not shown in the tables). Of these, 15 had 2 transitions and 1 had 3 transitions during the study period. Only one person

transitioned twice through MFP and seven transitioned twice through NHTP. The remaining individuals with more than one transition had experience with both programs.

Of the 684 transitions captured in the data, approximately one-third (32.2 percent) transitioned through MFP, the remaining transitioned to the community through NHTP. The age profiles of those referrals resulting in transition were similar across both programs although MFP participants were slightly less likely to be female (52.7 percent vs. 62.0 percent). MFP transfer decisions took more time than NHTP referrals from the time of the referral assessment (72 days vs. 40 days).

We identified a large number of missing values in the data for housing-related variables among those in NHTP because program staff did not start reporting this information until at least a year following the start of our study period. As a result, our interpretation of these data for NHTP should be read with caution. The community profiles of those who transitioned to the community by either program are similar. Nearly half of all NF residents reflected in these referrals resulting in a transition to the community moved into a leased apartment following discharge from the facility. Nearly a quarter of all transitions resulted in a move into a personal or family home following discharge. The one notable exception was that those transitioned through MFP were almost three times more likely to have received supplemental housing benefits compared to those transitioned through NHTP (64 MFP transitions [29.1 percent] vs 21 NHTP transitions [8.7 percent]).

Of the 85 with supplemental housing benefits, 40 were missing data on the type of benefits received. Among the other 45, the most frequent type of benefit received (n=25) was made available through the Public Housing Authority. Among the remaining 20, the other housing benefits included deeply subsidized housing (e.g., housing choice vouchers, Section 811), rent restricted supports, or other supports not specified in the data. Individuals who transitioned through NHTP primarily accessed benefits through the Public Housing Authority (10 out of 21). Individuals who transitioned MFP accessed a broader range of supplemental housing benefits but more than half of the cases were missing detail. Still, approximately half of those for which there was non-missing data received housing benefits through the Public Housing Authority.

Table 14 presents details of the outcomes for transitions that occurred through MFP. Of the 220 transitions made through MFP, over half (54.1 percent) resulted in the successful completion of the MFP program, which is defined as 365 days of participation. This analysis reflects all transitions, including those for individuals who may have had more than one transition during the study period.

Table 14. Outcomes of the NF Transition Process, MFP (N=220)

Characteristic	MFP (N=220)
Successfully Discharged After 365 Days (%)	54.1%
Still Enrolled in the Program (%)*	11.9%
Discharged Before 365 Days, by Reason (%)	
Discharged Due to Death (%)	12.4%
Voluntary Withdrawal (%)	5.2%
Other (%)	16.5%
Median Days from Transition to Discharge Before 365 Days	141 Days
1+ Suspensions from Program (%)**	51.0%
Reasons for Suspension**	
Admitted to Hospital (%)	59.6%
Hospitalization Followed by Long-Term Rehab (%)	19.2%
Other (%)	21.2%
Re-Activated After Suspension (%)**	51.5%

* This reflects that portion of those successfully transitioned who have not yet been discharged.

** The number of transitions with one or more suspensions associated with them and reasons for suspension are based on a sample of 194 individuals. We were missing data on suspensions for 26 transition cases (11.8 percent). Where more than one suspensions is associated with a transition case, the most recent suspension is reported.

The most common single cause of premature disenrollment from MFP was death (12.4 percent of total transitions), followed by voluntary withdrawal. “Other” reasons for disenrollment included that an individual moved out of the area, the participant no longer needed services, or the reason for dis-enrollment was unknown. Among those who were no longer enrolled in the program but did not achieve 365 days of MFP participation, the median length of time from transition to discharge was 141 days. Just over half of all transitions (N=99, 51 percent of non-missing cases) had one or more suspensions from the program post-transfer. Of these, just over half had only one suspension (53 cases). Another 20 (20.2 percent) had two suspensions and the remaining 26 (26.3 percent) had three or more suspensions. Most suspensions were due to hospitalization. Of transitions with suspensions, 52.1 percent were reactivated afterwards. We do not have additional information on those transitions that were suspended from the program and not reactivated prior to July 2016.

Table 15 details the information available to describe the outcomes of transition through NHTP.

Table 15. Outcomes of the NF Transition Process, NHTP (N=464)

Characteristic	NHTP (N=464)
NHTP Transfer to Case Management Agency (%)*	52.1%
Median Days from Transition to Case Management Agency	81 Days

* “Transfer to Case Management Agency” data were collected beginning in 2013; NHTP referrals pre-2013 were excluded from this analysis.

Among those participating in NHTP, the detail on disposition of transfers was lacking. Beginning in 2013, NHTP began capturing information on transfer to a case management agency. Transfer to a case management agency represents the end of formal coordination of services through NHTP. Among those whose transition occurred in 2013 or later, 52.1 percent of transitions were associated with subsequent transfer to case management agencies. The median days from transition to transfer to a case management agency was 81 days. Beyond this, we do not know the reasons for disenrollment among those participating in NHTP.

We examined more carefully the characteristics of individuals participating in MFP who were successfully discharged from the program following 365 days of participation to understand if there were distinguishing factors associated with success.

Table 16 details the characteristics of those who had a “successful” discharge (i.e., remained in the program for 365 days) as compared to those who were dis-enrolled prior to 365 days.

Table 16. Characteristics of Those Who Were Discharged from MFP

Characteristic	Successful Discharge (N=105)*	Disenrolled Prior to 365 Days (N=56)*
Female (%)	51.4%	53.6%
Age Group †		
< 65 years (%)	37.1%	23.2%
65-74 years (%)	30.5%	21.4%
75+ years (%)	32.4%	55.4%
Type of Housing Post-Transition †		
Home – Personal (%)	9.5%	24.1%
Home – Family (%)	15.2%	25.0%
Leased Apartment (%)	47.6%	39.3%
Assisted Living (%)	27.6%	14.3%
Housing Supplement Received (%)	32.4%	26.8%
Living with Family Members (%) †	30.5%	50.0%

* Excludes those who have no disenrollment code, thus total observations do not add up to 220.

† Indicates significant difference at $\alpha = .05$.

Those who had a successful transition were younger than those who had an incomplete transition and were more likely to be living independently in a leased apartment or living in assisted living. They were also slightly more likely to have had a housing supplement.

Table 17 details the Quality of Life (QoL) survey results by survey completion time. Baseline surveys were completed before transition while first and second follow-ups were taken one and two years after transition, respectively. Given the challenges described elsewhere regarding data quality, we are only able to evaluate the data cross-sectionally.

Table 17. Quality of Life Survey Results by Domain

Domain*	Survey Question in Rhode Island MFP Data	Baseline (N=105)	First Follow-Up (N=62)	Second Follow-Up (N=52)
Unmet Needs for Personal Care	Unmet Bathing Needs**	14.3%	12.9%	17.3%
	Unmet Food Needs**	5.1%	8.2%	4.1%
	Unmet Medicine Needs**	5.0%	11.5%	4.0%
	Unmet Toileting Needs**	19.6%	14.5%	3.9%
Community Integration	No Barrier to Community Interaction**	33.3%	49.2%	38.3%
Living Situation Satisfaction	Like Living Situation	74.7%	87.3%	92.0%
Satisfaction with Care	Happy with Staff or Supports	85.0%	88.9%	89.4%
Overall Life Satisfaction	Happy with Life	72.5%	77.4%	87.5%
Mood Status	Feeling Blue**	28.9%	50.0%	42.9%
	Feeling Irritable**	37.4%	31.0%	38.0%

* Domains listed here are derived from methodology used by Mathematic in their evaluation of MFP nationally.

** Lower is better

In the aggregate, the direction of measures over time from baseline to first and second follow-up suggests quality of life improvements overall among those who transitioned through MFP, with the exceptions of the following measures: unmet bathing needs, barriers to community interaction, and feeling blue. The robustness of these results and our interpretation are moderated by known limitations in the data source.

Discussion and Program/Policy Implications

APCD

The APCD analysis provides information to understand the individuals using LTSS in Rhode Island across setting and payer source. In particular, EOHHS staff expressed interest in knowing more about the “pre-Medicaid” population, those not known to the Medicaid program prior to their entry into LTSS. Lewin’s analyses focused on the characteristics of LTSS use by payer and setting of care, as well as the demographic, clinical, and enrollment characteristics of LTSS users by service use patterns: facility-based LTSS only, facility-based LTSS first followed by HCBS, HCBS only, and HCBS first followed by facility-based LTSS. To better understand factors associated with entry to LTSS, we focused on analyses of service utilization and spending in the 30 days immediately prior to the start of LTSS use.

Key findings include:

- Medicare beneficiaries constituted the vast majority of the “**pre-Medicaid**” population that used facility-based LTSS (either first or only) – those not eligible for Medicaid prior to LTSS entry but became eligible at some point afterward. We cannot be certain, however, whether they entered the facility from the community or were already residing in the facility as private pay residents prior to their appearance in the APCD. More than twice as many individuals who converted to Medicaid eligibility used facility-based LTSS only compared to those who did not become Medicaid eligible. The pre-Medicaid population who became Medicaid eligible was also more likely to have had a diagnosis of dementia or delirium. Although more than half of those who enrolled in Medicaid after initiating LTSS entered a facility first and later used HCBS, their characteristics appear more similar to those who, in the larger study population, used only facility-based LTSS.
- We analyzed the **predictors of facility-based LTSS** relative to HCBS use separately for Medicare-only or commercially insured prior to LTSS use and for dually eligible for Medicare and Medicaid or were enrolled in Medicaid only. In both populations, inpatient use drives facility admissions and specialty care has an important association with facility use. Older, Medicare-eligible individuals and those with dementia or delirium tend to use facility-based LTSS over HCBS.
- Approximately 95 percent of the **facility-only LTSS users** had no acute care service use prior to facility entry; only 5 percent had an inpatient admission in the prior 30 days. These individuals are more likely to be older, female, and more likely to be Medicaid eligible prior to facility entry (39 percent are either dual eligibles or Medicaid-only). This group also has a substantially higher prevalence of dementia/delirium than any other LTSS user group (47 percent compared to the population average prevalence of 4 percent).
- Those who **enter a facility first and later use HCBS** are the most expensive group, with Medicare paying the majority of the costs. Approximately 65 percent had one or more inpatient admissions in the 30 days prior to facility admission, contributing substantially to their costs. The results of regression analyses reveal substantial inpatient use in the 30

days prior to entry and this use serves as a significant predictor of facility-based LTSS use.

- The group who used **HCBS first followed by facility-based LTSS** had similar demographic and clinical profiles when compared to those who used facility-based LTSS first and HCBS later. HCBS utilization patterns are also very similar. However, their overall costs were lower than those who used facility services first. Only about nine percent of those who used HCBS first followed by facility-based LTSS had an inpatient admission immediately prior to LTSS use. This population may have been privately paying for facility-based care prior to their appearance in the APCD.
- The **HCBS-only population** appears qualitatively different from the other populations who used LTSS. They have less co-morbid disease, are younger, more likely to have commercial insurance and have an overall lower utilization of HCBS than the other groups. Further evaluation of this group may be helpful in developing a more precise definition of LTSS use for the state's purposes.
- **Planned inpatient admissions** (e.g., for hip/knee replacement) and facility-based post-acute care for rehabilitation following such a surgery may explain some of the results. For example, in the regression analysis, we find that having a non-traumatic joint condition is significantly and positively associated with facility-based LTSS following an inpatient admission. These types of admissions may be considered “planned” admissions. Having both an emergency room visit and one or more inpatient admissions in the 30 days prior to LTSS is also a strong predictor of facility use. Inpatient admissions with an emergency room visit potentially reflect “urgent” admissions.
- Specialty provider (e.g., medical/surgical specialties) spending had a significant and positive association with facility-based LTSS relative to HCBS.

Program and Policy Implications

- Identifying those who have LTSS needs in order to divert them from facility-based LTSS to HCBS is a critical challenge. There is a sizable population in our analyses that uses facility-based LTSS for whom we cannot confirm their location prior to their appearance in the facility. It is possible that they may have entered a facility directly from the community, however, some portion of them may have also been in a facility as private pay residents. In either case, this is a population with a high prevalence of cognitive impairment and some number that may have moved directly from the community into a facility. As such, engaging the community-based resources specific to Alzheimer's disease and related dementia is important. There is an opportunity to do outreach and assess for need in the community-based population with dementia, educating caregivers and providing support to caregivers such as respite care than can extend the time the individual with dementia can remain in the community. The state's ADRC/The POINT can play an important role in conducting the outreach and educating caregivers and that role should be reinforced.
- EOHHS should give special attention to the role of acute care hospitals and specialty providers given the significant association between inpatient use and subsequent LTSS use. When an inpatient admission is known and planned for, providers have an

opportunity to plan for what happens after the inpatient admission. EOHHS might consider pilot testing approaches to support care transitions, similar to those available through CMS' Community-based Care Transitions Program (CCTP) either through existing hospital and community-based organization relationships or through the Accountable Entities under consideration in Rhode Island.

- The quantitative analyses suggest that specialty care providers may play an influential role in the decision to enter facility-based LTSS and thus these providers should be a part of the solution as well. Training opportunities to sensitize providers to geriatric competencies as well as training on the services and supports available in the community as an alternative to facility-based LTSS can begin to change referral patterns. Further, EOHHS may also want to directly engage specialty providers in the incentives that may be available through Accountable Entities.
- Planned admissions may be more amenable to diversion efforts intended to avoid further placement in facility-based LTSS or to ensure that the facility placement is short-term as a result of pre-planning before the hospital stay, preparing the patient and his/her family for post-discharge care, as well as determining a treatment plan in advance. On the other hand, urgent hospital admissions may be associated with less planning, little time to prepare caregivers and the home setting for discharge, and little time to arrange the necessary services in the community to support safe discharge to the community. Urgent admissions create a challenge for discharge planning; specifically to arrange services in the community. In both planned and urgent admissions, informal supports or the home environment may not be available to safely meet the needs of an individual after hospital discharge. In these cases, nursing facility transition efforts become important and to help the individual come home or to find an alternative housing situation that will support safe discharge need engaging as soon as is feasible (see the discussion in the MFP/NHTP section of this report for more on this topic).

Future Analyses

This primarily descriptive analysis of the APCD revealed some important findings regarding patterns of LTSS use in Rhode Island. Additional work to understand the population using LTSS and, in particular, the clinical and other factors that influence that pathway by which individuals who use LTSS become Medicaid eligible would further enhance this analysis:

- Inpatient admissions are an important feature in the pathway to LTSS use. We recommend further work to understand the nature of the admissions. Our analyses examined the presence of co-morbid conditions over a one year period however, we do not know what specific condition drove the need for inpatient services, nor do we know what services (surgical or other) were provided. This level of detail will help to further specify predictive models of LTSS use.
- Further analysis is needed to define “planned” and “urgent” admission profiles; identifying these patterns of service use can help target interventions to divert individuals from institutional settings post-hospital discharge.
- The APCD is well-positioned to be used for analyses of small-area variation in LTSS referral practices. The data may be used to understand referral patterns from hospitals to

LTSS use vary across the state. The data may be used to focus on referral patterns among provider groups or individual providers as well.

- Our analyses focus on the 30 days prior to LTSS use and the data are censored with the end of CY 2013. An analysis of the data over a longer time period may identify patterns in service use that could identify an early predictor of LTSS use not identified in these analyses. As an example, researchers at the University of California, San Francisco examined administrative data over a 12-month period prior to LTSS use and identified a clear increase in spending over that period.²
- The analyses we present in this report suggest that greater use of specialty providers (e.g., medical and surgical specialists) is positively associated with facility-based LTSS use. Further work is warranted to tease out the role of providers in LTSS outcomes. In addition, to capture the duration of a provider relationship will require a time horizon longer than 30 days. Further, future analyses should disentangle the potential confounding of specialty care provided in the hospital setting from that provided in the community.
- We have limited ability to understand why some individuals may access HCBS first and others end up in facility-based LTSS. The analyses presented here suggest the two groups (HCBS-first and facility-first) have similar clinical profiles. The APCD lacks information about key factors that influence LTSS use such as ADLs, IADLs, informal supports, housing, etc. and could explain the different pathways to LTSS use. In addition, the APCD lacks information about private-pay LTSS (e.g., out-of-pocket, private long-term care insurance, other payers). The APCD claims could potentially be linked to the Minimum Data Set (MDS), OASIS, Medicaid waiver assessments, and other state datasets to learn more about the role of social supports and physical and cognitive function on LTSS use, including that which may be paid for out-of-pocket or through other private insurance.
- Linking these additional data sources to the APCD will also contribute to more detailed descriptions of LTSS “episodes” including the length of stay in each setting and the number of transitions between facility-based LTSS and the community. Undoubtedly, our definition of LTSS includes post-acute care by the very nature of the types of insurance coverage that pay for those services. Access to additional data sources such as those described above, can help refine the definition of LTSS. The additional data sources may also help to refine the analysis of the “pre-Medicaid” population to better pinpoint Medicaid enrollment timing and to understand better where in the LTSS episode enrollment occurs.

² See the California Medicaid Research Institute (CAMRI) webpage for related reports: <http://camri.ucsf.edu/home-and-community-based-services>.

MFP/NHTP

Rhode Island EOHHS is particularly interested in understanding how the MFP/NHTP data can illuminate what factors are associated with successful transition back into the community. Our analyses revealed that over two-thirds of all referrals fail to result in a transition back to the community. Further, MFP transitions identified in this analysis fall far short of the state's target transition goal for the program. The data are limited in helping us to better understand this finding more completely and more importantly, how to support successful transition. NHTP data are not as rich as MFP data and neither dataset is sufficiently detailed to track outcomes for all participants.

The data analyses conducted under the current contract reveal that the characteristics of the population transitioning from a nursing facility to the community are similar for those who transition through MFP as compared to those who transition through NHTP, with the exception of the median time from admission to referral and median time from referral to transition. This difference is driven primarily by differences in program policy including eligibility criteria for the two programs. The number of individuals transitioned through NHTP is almost double that of MFP, likely due to the longer duration of the NHTP program. Still, transitions through MFP for CY 2015 (the most recent complete year of data available) comprised approximately 60 percent of total transitions for that year.

EOHHS was particularly interested in understanding post-transition outcomes. The structure of the MFP/NHTP dataset does not allow us to easily evaluate these outcomes, particularly readmission to a nursing facility following transition to the community. In particular, the NHTP data lack any detail on outcomes of the program beyond transition to a case management agency. There is no long-term follow up to understand whether individuals who transition through NHTP or MFP return to a nursing facility. This analysis may be feasible by linking MFP and NHTP data to MDS assessments, however, this type of analysis was outside the scope of this project.

We presented in the data tables the proportion of individuals in the MFP program who had one or more suspensions from the program following transition. Just over half had one or more suspensions from MFP, with the primary reason for suspension being inpatient admission with or without a long-term rehabilitation transfer. About half of those who have a suspension return to the program. The data do not track what happens to the individuals who do not return after a suspension – it is possible that some of these individuals return to a nursing facility and have not been formally discharged from the program.

About half of the transitions occurring through the MFP program have a successful discharge after a year of program engagement (when the MFP benefits end). The characteristics of those with successful MFP transitions tend to be younger, placed in independent housing or assisted living, and are slightly more likely to have received a housing supplement as compared to those who were discharged earlier. As noted above, community housing becomes a critical factor in the success of community transition and this finding appears to support this observation. We suggest that the use of housing supplements be explored further to understand where they are available and whether there are opportunities to expand their availability.

The numbers transitioned through MFP are small and the eligibility criteria are restrictive in comparison to the eligibility criteria for NHTP. Nursing facility residents eligible for MFP must be enrolled in Medicaid and have been a resident of a nursing facility paid for by Medicaid for at least 90 days prior to transition. As reported by key informants as part of qualitative work conducted under this contract, the longer an individual resides in a nursing facility, the harder it may be to transition them to the community both because their acuity may increase during their stay and their prior housing arrangement may no longer be available to them. Residents may have lost their housing due to their extended institutional stay or their home may no longer accommodate their physical and cognitive needs, thus becoming an unsafe transition destination. Other states that have not kept pace with transition targets under MFP have cited the lack of safe, affordable, and accessible housing, acuity, and provider capacity as important reasons for not achieving stated transition goals.³

Program and Policy Implications

- While the MFP grant will continue in operation until December 2018, the state should begin to explore now what model is the best fit for the state as part of its strategy to rebalancing the LTSS delivery system from institutional settings to HCBS going forward.
- Accessible and affordable housing will continue to be an issue the state will need to grapple with in order to promote both nursing home transition and diversion.
- Data protocols, data collection tools, and training of staff can be developed to align data collection and improve overall quality of the data collected across transition programs, including program outcomes and quality of life.
- Building off of the improvements to the data infrastructure, a continuous quality improvement effort with regular (possibly monthly) should be implemented which includes reporting to EOHHS and providers of key metrics to reflect progress toward goals. A state-level dashboard to present data on transitions should also be created.

Future Analyses

- Additional qualitative evaluation is warranted to better understand where the current pain points are in MFP and NHTP that, if addressed, could increase the pace of transitions into the community, assuming the state decides that these transition programs should continue operations. This includes examining the reasons to explain why MFP has not achieved transition targets and evaluating the contextual and procedural issues associated with the large number of referrals that did not lead to a transition to the community, that lead to extended gaps between admission and referral assessment and between referral assessment and decision to transition, and to understand why MFP did not keep pace with stated targets.
- The role of housing supplements in MFP and NHTP and their association with transition success should be explored, including which specific supplements may be most effective.

³ See Kaiser Family Foundation. Money Follows the Person: A 2015 State Survey of Transitions, Services, and Costs. <http://kff.org/report-section/money-follows-the-person-a-2015-state-survey-of-transitions-services-and-costs-report/>

Ways that the availability of housing supplements can be expanded should also be identified.

- MDS data can be used to describe the characteristics of the nursing home population including length of stay, case mix/level of need, diagnostic profile, insurance history, etc. This assessment data can be used to describe the population that wants to transition back to the community (based on Section Q). Linking MDS data to the MFP and NHTP data, assuming there are appropriate identifiers to allow such linkage, may further describe the differences between those who were referred and did not transition and those who did transition.

Limitations of the Analyses

Some key limitations of our analyses may impact our interpretation of the data and influenced our ability to provide a more detailed response to selected analytic questions.

APCD

- Classifying LTSS services in APCD is challenged by the heterogeneous nature of the data included and a lack of submitter-specific LTSS indicator fields typically used in other analyses. The LTSS definition in the APCD includes post-acute care and rehabilitation. These types of services may be considered generally more short-term in nature and not indicative of ongoing support needs whereas LTSS reflect not just clinical need but also the social context in which services are provided. Those who have LTSS needs have an informal support system that is either not fully capable or sufficient to meet the individual's needs. We made efforts to mitigate the challenge to our definition by classifying subacute stays as inpatient stays and thereby excluding them from our facility-based LTSS definition. Further, the study sample excluded those whose only source of HCBS was therapy. Another measure development issue is around provider specialty codes – different submitters may capture this information differently and thus how services get classified as primary and specialty care providers may not be consistent. Further work would need to be done to ensure consistency in definition.
- There are important data sources to understanding the context in which LTSS are obtained that were not available in the APCD. Most notable are:
 - A lack of detail on LTSS paid for out of pocket or via other coverage (e.g., long-term care insurance);
 - No detail on informal supports and housing, which contribute significantly to the decision to use LTSS; and
 - No detail on functional needs including measures of activities of daily living (ADLs), instrumental activities of daily living (IADLs), and cognitive impairment.
- Information on diagnoses available in the claims was used to identify clinical conditions. These measures were based on two or more claims where the diagnosis of interest was present as a primary or secondary diagnosis. This is a fairly conservative approach to identifying clinical need. This approach also does not detail the specific conditions present at the time of entry to LTSS. Further evaluation of clinical need immediately prior to, or drawn from assessment data available elsewhere, could help refine the approach to understanding risk of LTSS use.
- Our analysis of conversion from Medicare to Medicaid during a facility-based LTSS admission is limited in that we cannot confirm if the conversion occurred specifically during a nursing facility stay or if it followed sometime after. We have detail on the month of enrollment in Medicaid but not a specific date. As noted earlier, we also do not have information on nursing facility stays paid for privately or through other insurance. As a result, without additional detail from the Medicaid application, we cannot determine

conclusively that an individual spent down to Medicaid eligibility during a nursing facility stay.

MFP/NHTP

- Generally speaking, the MFP/NHTP dataset is complex and, as reported elsewhere in this report, we observed data quality issues; for example, there are a substantial number of missing values in the data fields across tables and program types, especially prior to 2013. The NHTP transition data are not equivalent to MFP data, particularly for identifying discharges and identifying reasons for discharge. Further, there are some data reporting discrepancies across time due to changes in reporting processes leading to occasional ambiguity (e.g., referrals which have concurrent “transition placement” and “not a transition candidate” statuses).
- Rhode Island EOHHS requested that Lewin evaluate the quality of life data available following similar methods used by Mathematica in previous reports of the Money Follows the Person program given that Rhode Island was not included in those analyses. There were a number of important limitations to our analyses based on the quality of these data. There are missing data due to the loss of surveys during an RI EOHSS data migration process that took place in late 2013 or early 2014, as well as the unintentional overwriting of surveys for some, but not all, individuals in the dataset. Finally, there are follow-up surveys that cannot be reliably matched back to baseline surveys, thus requiring aggregated cross-sectional reporting of results instead of longitudinal reporting. These confounding issues, paired with relatively small observation sizes, severely limit the robustness of these data.

Appendix A. Data Methods for the APCD and MFP/NHTP Analyses

HealthFacts RI/All Payer Claims Database (APCD)

The analysis of the population using LTSS across payer sources used the HealthFacts RI/All Payer Claims Database (APCD) supplied by Rhode Island’s vendor, OnPoint. Lewin used member-level de-identified Medicare, Medicaid, and commercial medical claims data from 2012-2013 in this analysis, along with supplementary eligibility and provider data.

Table A.1 details the registered submitters to the APCD along with the periods in which data have been submitted and exceptions.⁴ The data were processed and analyzed using SAS 9.2 statistical programming software.

Table A.1. Details of Registered APCD Submitters

Submitter Code	Submitter Name*	Period(s)	Type(s) ⁺			
			Eligibility	Medical	Pharmacy	Provider
RIC0010	Aetna	2011 – ongoing				
RIC0010A	Aetna (Medicare)	2011 – ongoing				
RIC0576	BCBS of RI	2011 – ongoing				
RIC0025	Cigna East	2011 – ongoing				
RIC0025F	Cigna West	2011 – ongoing				
RIT0005	CVS (CaremarkPCS Health LLC)	2011 – ongoing	No data		No data	
RIC0213	Harvard Pilgrim Health Care	2011 – ongoing				
RIG0001	Medicaid/HP	2011 – ongoing				
RIG0002	Medicare/CMS	2011 – 2013				
RIC0835	NHPRI	2011 – ongoing				
RIC0835A	NHPRI (DME)	2011 – ongoing	RIC0835			RIC0835 †
RIC0835B	NHPRI (Behavioral Health)	2011 – ongoing	RIC0835			RIC0835 †
RIC0835C	NHPRI (Pharmacy)	2011 – ongoing	RIC0835			RIC0835 †
RIC0707	Tufts Health Plan	2011 – ongoing				
RIT0202	UBH	2011 – 2015				
RIC0423	UHC	2011 – ongoing				
RIC0423C	UHC (Medicare & Retirement)	2011 – ongoing				
RIC0708	UHC (New England)	2011 – ongoing				
RIC0423A	UHC (Student Resources)	2011 – ongoing				

* BCBS: Blue Cross/Blue Shield, NHPRI: Neighborhood Health Plan of Rhode Island; UBH: United Behavioral Health; UHC: United HealthCare.

⁺ Types: Submitting = green, data arriving under a different submitter code = red, not submitting = white

[†] 2011–2013 only; 2014+ provider data being reported by RIC0835 (primary)

Defining LTSS

This analysis sought to better understand the characteristics of those who used LTSS, their utilization patterns, and to examine their service utilization in the period just immediately prior to the commencement of LTSS use. The general approach to identifying the analytic sample

⁴ This table was provided to Lewin by OnPoint, the APCD vendor for Rhode Island.

involved first defining LTSS claims (per description provided below) using calendar year (CY) 2013 data. We further refined our approach by selecting those who had their first use of LTSS during CY 2013 (i.e., with a “clean period” with no LTSS use for at least 90 days prior to the first date observed in CY 2013).

In other data sources, such as Medicaid or the Chronic Condition Warehouse (CCW), data source specific fields can often simplify the identification of LTSS. However, APCDs typically do not have a unified code to identify LTSS. Lewin identified Rhode Island’s LTSS population by selecting users of LTSS defined by standard claim data elements, including procedure codes, revenue codes, and type of bill. We used this approach to provide a consistent definition applied across the multiple data contributors that submit data to the APCD.

Table A.2 lists the categories of home and community-based services (HCBS) identified using procedure codes.

Table A.2. Types of Home and Community-Based Services Included in APCD Analyses

HCBS Service Types	
• Adult Day Care	• Assisted Living
• Care Management	• Foster Care
• Habilitation	• Home Delivered Meals
• Home Health	• Homemaker
• Hospice	• Private Duty Nursing
• Respite	• Therapy
• Training	• Transportation

Lewin used these HCBS categories based on procedure codes previously for a paper submitted to CMS that analyzed Medicaid data from 33 states.⁵ A complete list of codes can be found in [Appendix A.1](#).

Lewin identified facility based LTSS by selecting claims with a type of bill starting with ‘2’ (Nursing Facility/SNF) or ‘6’ (ICF). We classified subacute stays, identified by evaluating the revenue codes found on the claim, with a type of bill code that starts with ‘2’ as inpatient and not facility based LTSS.

Defining the Analytic Sample

Upon identification of those who used LTSS, we limited the sample as described earlier to those whose first use of LTSS was in CY 2013. We applied the following exclusions to further specify the study population:

- Persons who only had therapy during CY 2013 and no other HCBS or facility based LTSS;
- Persons who were under 21 years of age; and
- Persons with a pregnancy diagnosis during CY 2012 or CY 2013.

⁵ The Lewin Group. (2012). *Evaluating Medicaid Long-Term Services and Supports Utilization*. Falls Church, VA.

We classified the population further based on LTSS utilization patterns:

- Facility Only: Those who entered facility-based LTSS in CY 2013 and had no subsequent LTSS in a home or community setting;
- Facility First: Those who entered facility-based LTSS in CY 2013 and then used HCBS after the first claim date for facility-based LTSS was identified;
- HCBS Only: Those who had HCBS claims in CY 2013 and had no subsequent LTSS in a facility;
- HCBS First: Those who had HCBS claims in CY 2013 and then were admitted to facility-based LTSS after the first claim date for HCBS was identified.

Covariate Creation

In addition to demographic information already contained in the APCD data (e.g. age, gender), Lewin created covariates for analysis including utilization and spend rates by service type and time period (e.g. 30 days prior to first LTSS event). Enrollment files provided insurance coverage and we classified individuals as Medicare-only, Medicaid-only, commercial-only, and dually eligible (both Medicare and Medicaid) based on enrollment in the month in which they started LTSS use in CY 2013. Additionally, we applied AHRQ’s Clinical Classification Software⁶ (CCS) logic to ICD-9 diagnosis codes present in the data to cluster diagnoses. Diagnostic group flags were created for each member to identify the existence of a clinical condition present in the 12 months prior to the first LTSS event. Selected from the CCS were 16 conditions that are or may lead to a chronic and ongoing condition that can impact physical and/or cognitive function. Beneficiaries were flagged as having the condition if they had at least two claims with one of the diagnostic categories in either the first or second position on that claim. The diagnostic conditions are available in [Appendix A.2](#). We also used the coverage type variable on the APCD eligibility file to determine insurance enrollment status immediately prior to LTSS entry (e.g., Medicare, Medicaid, Dually Eligible for Medicare and Medicaid, and Commercial Insurance enrollment).

Table A.3. Categories of Service

Category	Definition
Inpatient	Claims with room and board revenue codes between 100 and 219
Emergency Department	Claims with revenue codes '450','451','452','459','981'. Also includes professional services delivered in the Emergency Department. Only facility claims are included in utilization summaries to avoid double counting ER visits. Both professional and facility claims are included in expenditure summaries.
Durable Medical Equipment (DME)	Claims with procedure codes 'E0100'-'E9999', 'S5160'-'S5162', 'B4000'-'B4999', 'S9208'-'S9379', 'A4206'-'A9149', 'A9153'-'A9300', 'T4521'-'T4544' or revenue codes '270'-'279', '290'-'299', '290'-'293', '270'-'273','275'-'279','274'
Institutional Outpatient	Claim Type = Facility and not Inpatient, facility based long-term care, or DME
Primary Care	See list of specialties in Appendix A.3
Specialty Care	See list of specialties in Appendix A.3 (combines Medical and Surgical Specialties)
Other Services	Services not otherwise classified above

⁶ Agency for Healthcare Research and Quality Clinical Classification Software (CCS) for ICD-9-CM, accessed from <https://www.hcup-us.ahrq.gov/toolsssoftware/ccs/ccs.jsp> on 10/12/2016, Rockville MD.

To classify other types of non-LTSS utilization, we also combined categories of service to understand patterns of service use and spending (see Table A.3). We identified those in the analytic sample who had any use of services in these categories as well as the sum of total spending by category of service.

Statistical Analysis

Lewin performed a battery of descriptive analyses on the analytic dataset to ensure the accuracy of the APCD data, to describe the population, and to test logistic regression assumptions. To ensure the APCD data accuracy, we compared counts of LTSS users to those published in prior papers⁷ and to expenditure data supplied by the state of Rhode Island. Results were directionally similar (within about 10 percent).

To describe the population, Lewin presents tables, which use the variables described above to show the distribution of different types of HCBS utilization, demographic and clinical conditions. The tables also provide a summary of inpatient, emergency department, institutional outpatient and primary and specialty care use and spending.

To determine the most highly predictive variables for entry into facility based LTSS, Lewin constructed two logistic regressions. The first regression included persons who not enrolled in Medicaid prior to their first LTSS use (i.e., those enrolled in Medicare only or in commercial insurance). The second regression included only persons enrolled in Medicaid (including those who were dually eligible for Medicare and Medicaid). In both regressions, the dependent variable was defined as facility (1 = Facility First or Facility Only) versus HCBS (0 = HCBS First or HCBS Only) LTSS use.

Lewin developed SAS code to further understand the pre-Medicaid population and to support the state's interest in knowing who "converts" from Medicare or commercial insurance enrollment to become eligible for Medicaid while receiving LTSS. To conduct this analysis, we focused on the population who used facility-based LTSS (either first or only). We then identified those who had no Medicaid experience in the 12 months prior to the month of the first LTSS claim in the data, based on the enrollment files. While it is possible that an individual may come in and out of Medicaid eligibility, we established this criteria to ensure we had a population that would likely not have been known to the state prior to the start of LTSS use. We defined "conversion" to Medicaid based on the enrollment file. We examined the enrollment files for CY 2013 to identify whether an individual enrolled in Medicaid in any month following the date of the first LTSS claim in CY 2013. In total, we identified 131 individuals who enrolled in Medicaid following the start of LTSS. We profiled their demographic and clinical characteristics, as well as service utilization and spending against those who met the same criteria for this analysis but did not enroll in Medicaid.

Money Follows the Person/Nursing Home Transition Program

The Money Follows the Person/Nursing Home Transition Program (MFP/NHTP) analysis is based on administrative data maintained by RI EOHSS. Data are maintained in a Microsoft Access

⁷ The Lewin Group. (2011). *An Independent Evaluation of Rhode Island's Global Waiver*. Falls Church VA

database. MFP referral totals closely matched the report produced by Mathematica Policy Research⁸ that summarizes MFP State Grantee progress though the totals reported in this analyses are slightly lower (220 total transitions compared to 240 reported in the Mathematica report) in part due to different cut-off dates in the data available and excluded referrals due to data ambiguity. The database contains demographic, referral, and transition information for individuals referred for community placement from institutional care through NHTP or MFP between January 2010 and July 2016.⁹ The database that EOHHS provided to Lewin is organized by referral, rather than unique individuals through a series of data “tables” in Access. Ten individuals who were not matched with at least one referral were not included for analysis. Multiple referrals for the same individual were treated as different events for the purpose of this analysis unless otherwise specified. There were 2,749 referrals included in our analyses reflecting 2,411 individuals. Of the 2,749 referrals, there were 684 that resulted in a transition to the community across both MFP and NHTP.

The referral table (TableReferral) contains a unique record per referral which is linked to demographic information on the demographic table (TableDem), referral status information on status table (TableStatus), and transition information on the activity table (TableActivity).¹⁰ Supplemental information found on transition placement table (TableTransitionPlacement)¹¹ and MFP tracking table (TableMFPTracking) were also used.

For all descriptive variables reported, missing or invalid values were excluded unless otherwise specified. Some variables were not reported for the entire length of the analysis (e.g., variables in the transition placement table), and as such the referrals predating the start of reporting on those variables were excluded from analysis. When distance between dates was calculated (e.g., time from referral to transition), negative values were set as missing to minimize the influence of noise in the data. When the distance between nursing home admission and referral was calculated, referrals associated with individuals entering the nursing home before 2010 were excluded to reduce skew.

The referral programs were determined using the “referral type” field in the referral table. The referral programs (MFP, NHTP, Other) were not necessarily responsible for the individual’s transition into the community. Transition eligibility was determined by the reason code of “transition placement” in the status table. Conversely, a reason code of “not a candidate” indicated that the individual was not eligible for transfer. There were 684 referrals determined to be eligible for transition; 41 referrals had both “transition placement” and “not a candidate” statuses and were deemed too ambiguous for inclusion in descriptive analyses. Individuals who had neither status associated with their referral were assumed to still be in the referral process as of July 2016.

The transfer programs were determined using a two-step process based on the transition placement and MFP tracking tables. The transition referral table contained an MFP/NHTP indicator,

⁸ Mathematica Policy Research. (2016). *Money Follows the Person Demonstration: Overview of State Grantee Progress, January to December 2015*.

⁹ Data were transmitted to Lewin on July 22, 2016. It is our understanding that the data were complete as of this date.

¹⁰ TableActivity only contains information for MFP transitions. No similar table exists for NHTP transitions.

¹¹ TableTransitionPlacement contains data for transitions as of 11/2011. As such, referrals which occurred before this file existed do not contain certain information as noted below.

“TransType,” which was used to identify the transition program for linked referral records. For referrals not linked to the transition referral table, the existence of an MFP consent date in the MFP tracking table indicated transition through MFP. Alternatively, if the referral was not associated with either table, we categorized it as a NHTP transition.

The transfer outcomes for MFP referrals were determined using the reason codes in the activity table. The activity “dis-enrolled” with the reason code of “completed 365 days of participation” was considered a successful discharge while a disenrollment for other reasons was considered a negative outcome. If the referral did not have a disenrollment activity, then the individual associated with that referral was assumed to still be receiving benefits from MFP. MFP suspensions and re-activations were likewise determined using activity codes. NHTP data were not sufficiently detailed to understand discharges from the program. Reports of any disposition were not captured in the data until 2013 and the only indicator of status is “transfer to a case management agency.” Thus, we cannot completely understand other reasons for discharge or disenrollment in the data.

Quality of Life (QoL) Survey Analysis

QoL survey data were obtained from two data sources – RI EOHSS and Neighborhood Health Plan (NHP). Both data sources were combined to create dataset with 240 entries. The final analytic file excluded 20 entries due to duplication issues and one entry was excluded due to unknown entry type (i.e. baseline vs. first follow-up). The 219 remaining entries were included for analysis, though many surveys had missing or invalid values for various questions which were coded as blank. For survey questions used in the analysis, an answer of “yes” was recoded as “1” while an answer of “no” was recoded as “0.” Thus the closer the mean is to one corresponds to a higher rate of “yes” responses and conversely, the closer the mean is to zero corresponds to a higher rate of “no” responses. Person-level linkage of data over time (i.e., between baseline, first follow-up, and second follow-up) was very low; only 6.4 percent had both a baseline and first follow-up entry, 7.9 percent had both a first and second follow-up entry but no baseline, and there were no cases where there was complete linkage across all three data collection periods. As a result, analyses are reported cross-sectionally instead of longitudinally, which limits interpretation of the data. The Lewin team was unable to further mitigate known issues in the data, including missing entries not contained in the provided databases and overwritten entries by staff.

Appendix A.1. Home and Community-Based Services (HCBS) Classification

Category	Definition
Adult Day	S5100, S5101, S5102, S5105
Assisted Living	H0043, H0044, T2030, T2031, T2032, T2033, T2034
Care Management	G9002, G9003, G9004, G9005, G9006, G9007, G9008, G9009, G9010, G9011, G9012, S0220, S0221, S0250, T1016, T1017, T1023, T1024, T2022, T2023, T2024
Foster Care	H0041, S5140, S5141, S5145, S5146
Habilitation	T2013, T2014, T2015, T2016, T2017, T2018, T2019, T2020, T2021, T2038
Home Delivered Meals	S5170, W1261
Home Health	99503, 99505, 99506, 99600, 99601, 99602, G0156, G0179, G0180, G0181, G0182, S5108, S5109, S5110, S5111, S5116, S5180, S5181, S9097, S9127, S9325, S9326, S9327, S9328, S9329, S9330, S9331, S9336, S9338, S9340, S9341, S9342, S9343, S9345, S9346, S9347, S9348, S9349, S9351, S9353, S9355, S9359, S9364, S9365, S9366, S9367, S9368, S9370, S9372, S9373, S9374, S9375, S9376, S9377, S9379, S9474, S9490, S9494, S9497, S9500, S9501, S9502, S9503, S9504, S9537, S9542, S9560, S9562, T1004, T1021, T1022
Homemaker	S5120, S5121, S5130, S5131, S5175, W2100, W2101, W2103
Hospice	Q5001-Q5010, type of bill = 81X, 82X, S9126, T2042, T2043, T2044, T2045, T2046
Private Duty Nursing	G0154, S9122, S9123, S9124, T1000, T1001, T1002, T1003
Respite	H0045, S5150, S5151, S9125, T1005
Therapy	97001, 97002, 97003, 97004, 97005, 97010, 97012, 97014, 97016, 97018, 97022, 97024, 97026, 97028, 97032, 97033, 97035, 97039, 97110, 97112, 97113, 97116, 97124, 97139, 97140, 97150, 97530, 97532, 97533, 97542, G0151, G0152, G0153, G0237, G0238, S9128, S9129, S9131
Training	97535, 97537
Transportation	A0080, A0100, A0110, A0120, A0130, A0160, A0170, A0380, A0382, A0390, A0392, A0394, A0396, A0398, A0420, A0422, A0425, A0426, A0427, A0428, A0429, A0431, A0434, A0436, A0998, S0215, T2001, T2002, T2003, T2004

Appendix A.2. Definitions of Diagnosis Groups for APCD Analysis

Cancer

2.1 Colorectal cancer

2.1.1 Cancer of colon [14.]

1530 1531 1532 1533 1534 1535 1536 1537 1538 1539
1590 20910 20911 20912 20913 20914 20915 20916 2303 V1005

2.1.2 Cancer of rectum and anus [15.]

1540 1541 1542 1543 1548 20917 2304 2305 2306 79670
79671 79672 79673 79674 79676 V1006

2.2 Other gastrointestinal cancer

2.2.1 Cancer of esophagus [12.]

1500 1501 1502 1503 1504 1505 1508 1509 2301 V1003

2.2.2 Cancer of stomach [13.]

1510 1511 1512 1513 1514 1515 1516 1518 1519 20923
2302 V1004

2.2.3 Cancer of liver and intrahepatic bile duct [16.]

1550 1551 1552 2308 V1007

2.2.4 Cancer of pancreas [17.]

1570 1571 1572 1573 1574 1578 1579

2.2.5 Cancer of other GI organs; peritoneum [18.]

1520 1521 1522 1523 1528 1529 1560 1561 1562 1568
1569 1580 1588 1589 1591 1598 1599 20900 20901 20902
20903 2307 2309 V1000 V1009

2.3 Cancer of bronchus; lung [19.]

1622 1623 1624 1625 1628 1629 20921 2312 V1011

2.4 Cancer of skin

2.4.1 Melanomas of skin [22.]

1720 1721 1722 1723 1724 1725 1726 1727 1728 1729
V1082

2.4.2 Other non-epithelial cancer of skin [23.]

1730 17300 17301 17302 17309 1731 17310 17311 17312 17319
1732 17320 17321 17322 17329 1733 17330 17331 17332 17339
1734 17340 17341 17342 17349 1735 17350 17351 17352 17359
1736 17360 17361 17362 17369 1737 17370 17371 17372 17379
1738 17380 17381 17382 17389 1739 17390 17391 17392 17399
20931 20932 20933 20934 20935 20936 2320 2321 2322 2323
2324 2325 2326 2327 2328 2329 V1083

2.5 Cancer of breast [24.]

1740 1741 1742 1743 1744 1745 1746 1748 1749 1750

1759 2330 V103

2.6 Cancer of uterus and cervix

2.6.1 Cancer of uterus [25.]
179 1820 1821 1828 2332 V1042

2.6.2 Cancer of cervix [26.]
1800 1801 1808 1809 2331 7950 79501 79502 79503 79504
79506 V1041

2.7 Cancer of ovary and other female genital organs

2.7.1 Cancer of ovary [27.]
1830 V1043

2.7.2 Cancer of other female genital organs [28.]
181 1832 1833 1834 1835 1838 1839 1840 1841 1842
1843 1844 1848 1849 2333 23330 23331 23332 23339 79516
V1040 V1044

2.8 Cancer of male genital organs

2.8.1 Cancer of prostate [29.]
185 2334 V1046

2.8.2 Cancer of testis [30.]
1860 1869 V1047

2.8.3 Cancer of other male genital organs [31.]
1871 1872 1873 1874 1875 1876 1877 1878 1879 2335
2336 V1045 V1048 V1049

2.9 Cancer of urinary organs

2.9.1 Cancer of bladder [32.]
1880 1881 1882 1883 1884 1885 1886 1887 1888 1889
2337 V1051

2.9.2 Cancer of kidney and renal pelvis [33.]
1890 1891 20924 V1052 V1053

2.9.3 Cancer of other urinary organs [34.]
1892 1893 1894 1898 1899 2339 V1050 V1059

2.10 Cancer of lymphatic and hematopoietic tissue

2.10.1 Hodgkins disease [37.]
20100 20101 20102 20103 20104 20105 20106 20107 20108 20110
20111 20112 20113 20114 20115 20116 20117 20118 20120 20121
20122 20123 20124 20125 20126 20127 20128 20140 20141 20142
20143 20144 20145 20146 20147 20148 20150 20151 20152 20153
20154 20155 20156 20157 20158 20160 20161 20162 20163 20164
20165 20166 20167 20168 20170 20171 20172 20173 20174 20175
20176 20177 20178 20190 20191 20192 20193 20194 20195 20196

20197 20198 V1072

2.10.2 Non-Hodgkins lymphoma [38.]

20000 20001 20002 20003 20004 20005 20006 20007 20008 20010
20011 20012 20013 20014 20015 20016 20017 20018 20020 20021
20022 20023 20024 20025 20026 20027 20028 20030 20031 20032
20033 20034 20035 20036 20037 20038 20040 20041 20042 20043
20044 20045 20046 20047 20048 20050 20051 20052 20053 20054
20055 20056 20057 20058 20060 20061 20062 20063 20064 20065
20066 20067 20068 20070 20071 20072 20073 20074 20075 20076
20077 20078 20080 20081 20082 20083 20084 20085 20086 20087
20088 20200 20201 20202 20203 20204 20205 20206 20207 20208
20210 20211 20212 20213 20214 20215 20216 20217 20218 20220
20221 20222 20223 20224 20225 20226 20227 20228 20270 20271
20272 20273 20274 20275 20276 20277 20278 20280 20281 20282
20283 20284 20285 20286 20287 20288 20290 20291 20292 20293
20294 20295 20296 20297 20298 V1071 V1079

2.10.3 Leukemias [39.]

20240 20241 20242 20243 20244 20245 20246 20247 20248 2031
20310 20311 20312 2040 20400 20401 20402 2041 20410 20411
20412 2042 20420 20421 20422 2048 20480 20481 20482 2049
20490 20491 20492 2050 20500 20501 20502 2051 20510 20511
20512 2052 20520 20521 20522 2053 20530 20531 20532 2058
20580 20581 20582 2059 20590 20591 20592 2060 20600 20601
20602 2061 20610 20611 20612 2062 20620 20621 20622 2068
20680 20681 20682 2069 20690 20691 20692 2070 20700 20701
20702 2071 20710 20711 20712 2072 20720 20721 20722 2078
20780 20781 20782 2080 20800 20801 20802 2081 20810 20811
20812 2082 20820 20821 20822 2088 20880 20881 20882 2089
20890 20891 20892 V1060 V1061 V1062 V1063 V1069

2.10.4 Multiple myeloma [40.]

2030 20300 20301 20302 2038 20380 20381 20382

2.11 Cancer; other primary

2.11.1 Cancer of head and neck [11.]

1400 1401 1403 1404 1405 1406 1408 1409 1410 1411
1412 1413 1414 1415 1416 1418 1419 1420 1421 1422
1428 1429 1430 1431 1438 1439 1440 1441 1448 1449
1450 1451 1452 1453 1454 1455 1456 1458 1459 1460
1461 1462 1463 1464 1465 1466 1467 1468 1469 1470
1471 1472 1473 1478 1479 1480 1481 1482 1483 1488
1489 1490 1491 1498 1499 1600 1601 1602 1603 1604
1605 1608 1609 1610 1611 1612 1613 1618 1619 1950
2300 2310 V1001 V1002 V1021

2.11.2 Cancer; other respiratory and intrathoracic [20.]

1620 1630 1631 1638 1639 1650 1658 1659 2311 2318
2319 V1012 V1020 V1022

2.11.3 Cancer of bone and connective tissue [21.]

1700 1701 1702 1703 1704 1705 1706 1707 1708 1709
1710 1712 1713 1714 1715 1716 1717 1718 1719

- 2.11.4 Cancer of brain and nervous system [35.]
1910 1911 1912 1913 1914 1915 1916 1917 1918 1919
1920 1921 1922 1923 1928 1929 V1085 V1086
- 2.11.5 Cancer of thyroid [36.]
193 25802 25803 V1087
- 2.11.6 Cancer; other and unspecified primary [41.]
1640 1641 1642 1643 1648 1649 1760 1761 1762 1763
1764 1765 1768 1769 1900 1901 1902 1903 1904 1905
1906 1907 1908 1909 1940 1941 1943 1944 1945 1946
1948 1949 1951 1952 1953 1954 1955 1958 20230 20231
20232 20233 20234 20235 20236 20237 20238 20250 20251 20252
20253 20254 20255 20256 20257 20258 20260 20261 20262 20263
20264 20265 20266 20267 20268 20922 20925 20926 20927 2340
2348 2349 7951 79510 79511 79512 79513 79514 V1029 V1081
V1084 V1088 V1089 V109 V1090 V1091 V711
- 2.12 Secondary malignancies [42.]
 - 2.12.1 Secondary malignancy of lymph nodes
1960 1961 1962 1963 1965 1966 1968 1969 20971
 - 2.12.2 Secondary malignancy of lung
1970
 - 2.12.3 Secondary malignancy of liver
1977 20972
 - 2.12.4 Secondary malignancy of brain/spine
1983
 - 2.12.5 Secondary malignancy of bone
1985 20973
 - 2.12.6 Other secondary malignancy
1971 1972 1973 1974 1975 1976 1978 1980 1981 1982
1984 1986 1987 19881 19882 19889 20974 51181 78951
- 2.13 Malignant neoplasm without specification of site [43.]
1990 1991 1992 20920 20929 20930 20970 20975 20979
- 2.14 Neoplasms of unspecified nature or uncertain behavior [44.] -
2350 2351 2352 2353 2354 2355 2356 2357 2358 2359
2360 2361 2362 2363 2364 2365 2366 2367 23690 23691
23699 2370 2371 2372 2373 2374 2375 2376 2377 23770
23771 23772 23773 23779 2379 2380 2381 2382 2383 2384
2385 2386 2387 23871 23872 23873 23874 23875 23876 23877
23879 2388 2389 2390 2391 2392 2393 2394 2395 2396
2397 2398 23981 23989 2399
- 2.15 Maintenance chemotherapy; radiotherapy [45.]
 - 2.15.1 Radiotherapy

V580 V661 V671

2.15.2 Chemotherapy

V581 V5811 V5812 V662 V672

2.16 Benign neoplasms

2.16.1 Benign neoplasm of uterus [46.]

2180 2181 2182 2189 2190 2191 2198 2199

2.16.2 Other and unspecified benign neoplasm [47.]

2.16.2.1 Benign neoplasm of ovary

220

2.16.2.2 Benign neoplasm of colon

20950 20951 20952 20953 20954 20955 20956 20957 2113 2114
V1272

2.16.2.3 Benign neoplasm of the thyroid

226

2.16.2.4 Benign neoplasm of cerebral meninges

2252

2.16.2.5 Other and unspecified benign neoplasms

20940 20941 20942 20943 20960 20961 20962 20963 20964 20965
20966 20967 20969 2100 2101 2102 2103 2104 2105 2106
2107 2108 2109 2110 2111 2112 2115 2116 2117 2118
2119 2120 2121 2122 2123 2124 2125 2126 2127 2128
2129 2130 2131 2132 2133 2134 2135 2136 2137 2138
2139 2140 2141 2142 2143 2144 2148 2149 2150 2152
2153 2154 2155 2156 2157 2158 2159 2160 2161 2162
2163 2164 2165 2166 2167 2168 2169 217 2210 2211
2212 2218 2219 2220 2221 2222 2223 2224 2228 2229
2230 2231 2232 2233 22381 22389 2239 2240 2241 2242
2243 2244 2245 2246 2247 2248 2249 2250 2251 2253
2254 2258 2259 2270 2271 2273 2274 2275 2276 2278
2279 22800 22801 22802 22803 22804 22809 2281 2290 2298 2299

Diabetes

3.2 Diabetes mellitus without complication [49.]

24900 25000 25001 7902 79021 79022 79029 7915 7916 V4585
V5391 V6546

3.3 Diabetes mellitus with complications [50.]

3.3.1 Diabetes with ketoacidosis or uncontrolled diabetes

24901 24910 24911 25002 25003 25010 25011 25012 25013

3.3.2 Diabetes with renal manifestations

24940 24941 25040 25041 25042 25043

3.3.3 Diabetes with ophthalmic manifestations

24950 24951 25050 25051 25052 25053

3.3.4 Diabetes with neurological manifestations

24960 24961 25060 25061 25062 25063

3.3.5 Diabetes with circulatory manifestations

24970 24971 25070 25071 25072 25073

3.3.6 Diabetes with unspecified complications

24990 24991 25090 25091

3.3.7 Diabetes with other manifestations

24920 24921 24930 24931 24980 24981 25020 25021 25022 25023
25030 25031 25032 25033 25080 25081 25082 25083 25092 25093

Anemia

4.1 Anemia

4.1.1 Acute posthemorrhagic anemia [60.]

2851

4.1.2 Sickle cell anemia [61.]

28241 28242 2825 28260 28261 28262 28263 28264 28268 28269

4.1.3 Deficiency and other anemia [59.]

4.1.3.1 Iron deficiency anemia

2801 2808 2809

4.1.3.2 Other deficiency anemia

2810 2811 2812 2813 2814 2818 2819

4.1.3.3 Aplastic anemia

2840 28401 28409 2841 28411 28412 28419 2848 28481 28489
2849

4.1.3.4 Chronic blood loss anemia

2800

4.1.3.5 Acquired hemolytic anemia

2830 2831 28310 28311 28319 2832 2839

4.1.3.6 Other specified anemia

2820 2821 2822 2823 2824 28240 28243 28244 28245 28246
28247 28249 2827 2828 2829 2842 2850 28521 28522 28529
2858

4.1.3.7 Anemia; unspecified

2859

Dementia and Delirium

5.4 Delirium, dementia, and amnesic and other cognitive disorders

2900 29010 29011 29012 29013 29020 29021 2903 29040 29041
29042 29043 2908 2909 2930 2931 2940 2941 29410 29411

29420 29421 2948 2949 3100 3102 3108 31081 31089 3109 3310
3311 33111 33119 3312 33182 797

Mood Disorders

5.8 Mood disorders [657.]

5.8.1 Bipolar disorders [6571]

29600 29601 29602 29603 29604 29605 29606 29610 29611 29612
29613 29614 29615 29616 29640 29641 29642 29643 29644 29645
29646 29650 29651 29652 29653 29654 29655 29656 29660 29661
29662 29663 29664 29665 29666 2967 29680 29681 29682 29689
29690 29699

5.8.2 Depressive disorders [6572]

29383 29620 29621 29622 29623 29624 29625 29626 29630 29631
29632 29633 29634 29625 29636 3004 311

Hereditary and Degenerative Nervous System Conditions

6.2 Hereditary and degenerative nervous system conditions

6.2.1 Parkinsons disease [79.]

3320

6.2.2 Multiple sclerosis [80.]

340

6.2.3 Other hereditary and degenerative nervous system conditions [81.]

6.2.3.1 Disorders of the autonomic nervous system

3370 33700 33701 33709 3371 3373 3379

6.2.3.2 Other and unspecified hereditary and degenerative nervous conditions

3300 3301 3302 3303 3308 3309 3313 3314 3315 3316
3317 33181 33189 3319 3330 3331 3332 3333 3334 3335
3336 3337 33371 33372 33379 33381 33382 33383 33384 33385
33389 33390 33391 33393 33394 33399 3340 3341 3342 3343
3344 3348 3349 3350 33510 33511 33519 33520 33521 33522
33523 33524 33529 3358 3359 3360 3361 3362 3363 3368
3369

Eye Disorders

6.7 Eye disorders

6.7.1 Cataract [86.]

36600 36601 36602 36603 36604 36609 36610 36611 36612 36613
36614 36615 36616 36617 36618 36619 36620 36621 36622 36623
36630 36631 36632 36633 36634 36641 36642 36643 36644 36645
36646 36650 36651 36652 36653 3668 3669 V431

6.7.2 Retinal detachments; defects; vascular occlusion; and retinopathy

6.7.2.1 Retinal detachment with defect

36100 36101 36102 36103 36104 36105 36106 36107

6.7.2.2 Other retinal detachment or defect

36110 36111 36112 36113 36114 36119 3612 36130 36131 36132
36133 36181 36189 3619

6.7.2.3 Other retinal disorders

36201 36202 36203 36204 36205 36206 36207 36210 36211 36212
36213 36214 36215 36216 36217 36218 36220 36221 36222 36223
36224 36225 36226 36227 36229 36230 36231 36232 36233 36234
36235 36236 36237 36240 36241 36242 36243 36250 36251 36252
36253 36254 36255 36256 36257 36260 36261 36262 36263 36264
36265 36266 36270 36271 36272 36273 36274 36275 36276 36277
36281 36282 36283 36284 36285 36289 3629

6.7.3 Glaucoma [88.]

36500 36501 36502 36503 36504 36505 36506 36510 36511 36512
36513 36514 36515 36520 36521 36522 36523 36524 36531 36532
36541 36542 36543 36544 36551 36552 36559 36560 36561 36562
36563 36564 36565 36570 36571 36572 36573 36574 36581 36582
36583 36589 3659

6.7.4 Blindness and vision defects [89.]

3670 3671 36720 36721 36722 36731 36732 3674 36751 36752
36753 36781 36789 3679 36800 36801 36802 36803 36810 36811
36812 36813 36814 36815 36816 3682 36830 36831 36832 36833
36834 36840 36841 36842 36843 36844 36845 36846 36847 36851
36852 36853 36854 36855 36859 36860 36861 36862 36863 36869
3688 3689 36900 36901 36902 36903 36904 36905 36906 36907
36908 36910 36911 36912 36913 36914 36915 36916 36917 36918
36920 36921 36922 36923 36924 36925 3693 3694 36960 36961
36962 36963 36964 36965 36966 36967 36968 36969 36970 36971
36972 36973 36974 36975 36976 3698 3699 V410

6.7.5 Inflammation; infection of eye (except that caused by TB or STD)

0213 03281 05320 05321 05322 05329 05440 05441 05442 05443
05444 05449 05571 0760 0761 0769 0770 0771 0772 0773
0774 0778 0779 07798 07799 11502 11512 11592 1301 1302
1391 36000 36001 36002 36003 36004 36011 36012 36013 36014
36019 36300 36301 36303 36304 36305 36306 36307 36308 36310
36311 36312 36313 36314 36315 36320 36321 36322 36400 36401
36402 36403 36404 36405 36410 36411 36421 36422 36423 36424
3643 37020 37021 37022 37023 37024 37031 37032 37033 37034
37035 37040 37044 37049 37050 37052 37054 37055 37059 3708
3709 37200 37201 37202 37203 37204 37205 37206 37210 37211
37212 37213 37214 37215 37220 37221 37222 37230 37231 37233
37239 37300 37301 37302 37311 37312 37313 37331 37332 37333
37334 3734 3735 3736 3738 3739 37500 37501 37502 37503
37530 37531 37532 37533 37541 37542 37543 37600 37601 37602
37603 37604 37610 37611 37612 37613 37730 37731 37732 37733
37734 37739 37900 37901 37902 37903 37904 37905 37906 37907
37909 37960 37961 37962 37963

6.7.6 Other eye disorders [91.]

36020 36021 36023 36024 36029 36030 36031 36032 36033 36034

36040 36041 36042 36043 36044 36050 36051 36052 36053 36054
36055 36059 36060 36061 36062 36063 36064 36065 36069 36081
36089 3609 36330 36331 36332 36333 36334 36335 36340 36341
36342 36343 36350 36351 36352 36353 36354 36355 36356 36357
36361 36362 36363 36370 36371 36372 3638 3639 36441 36442
36451 36452 36453 36454 36455 36456 36457 36459 36460 36461
36462 36463 36464 36470 36471 36472 36473 36474 36475 36476
36477 3648 36481 36482 36489 3649 37000 37001 37002 37003
37004 37005 37006 37007 37060 37061 37062 37063 37064 37100
37101 37102 37103 37104 37105 37110 37111 37112 37113 37114
37115 37116 37120 37121 37122 37123 37124 37130 37131 37132
37133 37140 37141 37142 37143 37144 37145 37146 37148 37149
37150 37151 37152 37153 37154 37155 37156 37157 37158 37160
37161 37162 37170 37171 37172 37173 37181 37182 37189 3719
37234 37240 37241 37242 37243 37244 37245 37250 37251 37252
37253 37254 37255 37256 37261 37262 37263 37264 37271 37272
37273 37274 37275 3728 37281 37289 3729 3732 37400 37401
37402 37403 37404 37405 37410 37411 37412 37413 37414 37420
37421 37422 37423 37430 37431 37432 37433 37434 37441 37443
37444 37445 37446 37450 37451 37452 37453 37454 37455 37456
37481 37482 37483 37484 37485 37486 37487 37489 3749 37511
37512 37513 37514 37515 37516 37520 37521 37522 37551 37552
37553 37554 37555 37556 37557 37561 37569 37581 37589 3759
37621 37622 37630 37631 37632 37633 37634 37635 37636 37640
37641 37642 37643 37644 37645 37646 37647 37650 37651 37652
3766 37681 37682 37689 3769 37700 37701 37702 37703 37704
37710 37711 37712 37713 37714 37715 37716 37721 37722 37723
37724 37741 37742 37743 37749 37751 37752 37753 37754 37761
37762 37763 37771 37772 37773 37775 3779 37800 37801 37802
37803 37804 37805 37806 37807 37808 37810 37811 37812 37813
37814 37815 37816 37817 37818 37820 37821 37822 37823 37824
37830 37831 37832 37833 37834 37835 37840 37841 37842 37843
37844 37845 37850 37851 37852 37853 37854 37855 37856 37860
37861 37862 37863 37871 37872 37873 37881 37882 37883 37884
37885 37886 37887 3789 37911 37912 37913 37914 37915 37916
37919 37921 37922 37923 37924 37925 37926 37927 37929 37931
37932 37933 37934 37939 37940 37941 37942 37943 37945 37946
37949 37950 37951 37952 37953 37954 37955 37956 37957 37958
37959 3798 37990 37991 37992 37993 37999 78193 V411 V425
V430 V456 V4561 V4569 V522 V531 V720

Hypertension

7.1 Hypertension

7.1.1 Essential hypertension [98.] 4011 4019

7.1.2 Hypertension with complications and secondary hypertension [99.]

7.1.2.1 Hypertensive heart and/or renal disease 40200 40201 40210 40211 40290 40291 4030 40300 40301 4031 40310 40311 4039 40390 40391 4040 40400 40401 40402 40403 4041 40410 40411 40412 40413 4049 40490 40491 40492 40493

7.1.2.2 Other hypertensive complications

4010 40501 40509 40511 40519 40591 40599 4372

Heart Disease

7.2.1 Heart valve disorders [96.]

7.2.1.1 Chronic rheumatic disease of the heart valves
3940 3941 3942 3949 3950 3951 3952 3959 3960 3961
3962 3963 3968 3969 3970 3971 3979

7.2.1.2 Nonrheumatic mitral valve disorders
4240

7.2.1.3 Nonrheumatic aortic valve disorders
4241

7.2.1.4 Other heart valve disorders
4242 4243 42490 42491 42499 7852 7853 V422 V433

7.2.2 Peri-, endo-, and myocarditis; cardiomyopathy (except that caused by TB or STD)

7.2.2.1 Cardiomyopathy
4250 4251 42511 42518 4252 4253 4254 4257 4258 4259

7.2.2.2 Other peri-, endo-, and myocarditis
03282 03640 03641 03642 03643 07420 07421 07422 07423 11281
11503 11504 11513 11514 11593 11594 1303 3910 3911 3912
3918 3919 3920 393 3980 39890 39899 4200 42090 42091
42099 4210 4211 4219 4220 42290 42291 42292 42293 42299
4230 4231 4232 4233 4238 4239 4290

7.2.3 Acute myocardial infarction [100.]
4100 41000 41001 41002 4101 41010 41011 41012 4102 41020
41021 41022 4103 41030 41031 41032 4104 41040 41041 41042
4105 41050 41051 41052 4106 41060 41061 41062 4107 41070
41071 41072 4108 41080 41081 41082 4109 41090 41091 41092

7.2.4 Coronary atherosclerosis and other heart disease [101.]
41406

7.2.4.1 Angina pectoris
4130 4131 4139

7.2.4.2 Unstable angina (intermediate coronary syndrome)
4111

7.2.4.3 Other acute and subacute forms of ischemic heart disease
4110 4118 41181 41189

7.2.4.4 Coronary atherosclerosis
4140 41400 41401 4142 4143 4144 V4582

7.2.4.5 Other forms of chronic heart disease
412 4148 4149 V4581

- 7.2.5 Nonspecific chest pain [102.]
78650 78651 78659
- 7.2.6 Pulmonary heart disease [103.]
4150 4151 41512 41513 41519 4160 4161 4162 4168 4169
4170 4171 4178 4179 V1255
- 7.2.7 Other and ill-defined heart disease [104.]
41410 41411 41412 41419 4291 4292 4293 4295 4296 42971
42979 42981 42982 42983 42989 4299
- 7.2.8 Conduction disorders [105.]
 - 7.2.8.1 Atrioventricular block
4260 42610 42611 42612 42613
 - 7.2.8.2 Bundle branch block
4262 4263 4264 42650 42651 42652 42653 42654
 - 7.2.8.3 Anomalous atrioventricular excitation
4267
 - 7.2.8.4 Other conduction disorders
4266 42681 42682 42689 4269 V450 V4500 V4501 V4502 V4509
V533 V5331 V5332 V5339
- 7.2.9 Cardiac dysrhythmias [106.]
 - 7.2.9.1 Paroxysmal supraventricular tachycardia
4270
 - 7.2.9.2 Paroxysmal ventricular tachycardia
4271
 - 7.2.9.3 Atrial fibrillation
42731
 - 7.2.9.4 Atrial flutter
42732
 - 7.2.9.5 Premature beats
42760 42761 42769
 - 7.2.9.6 Sinoatrial node dysfunction
42781
 - 7.2.9.7 Other cardiac dysrhythmias
4272 42789 4279 7850 7851
- 7.2.10 Cardiac arrest and ventricular fibrillation [107.]
42741 42742 4275
- 7.2.11 Congestive heart failure; nonhypertensive [108.]
42820 42821 42822 42823 42830 42831 42832 42833 42840 42841

42842 42843

7.2.11.1 Congestive heart failure
4280

7.2.11.2 Heart failure
39891 4281 4289

Cerebrovascular Disease

7.3.1 Acute cerebrovascular disease [109.]

7.3.1.1 Intracranial hemorrhage
430 431 4320 4321 4329

7.3.1.2 Occlusion of cerebral arteries
43301 43311 43321 43331 43381 43391 4340 43400 43401 4341
43410 43411 4349 43490 43491

7.3.1.3 Acute but ill-defined cerebrovascular accident
34660 34661 34662 34663 436

7.3.2 Occlusion or stenosis of precerebral arteries [110.]
4330 43300 4331 43310 4332 43320 4333 43330 4338 43380
4339 43390

7.3.3 Other and ill-defined cerebrovascular disease [111.]
4370 4371 4373 4374 4375 4376 4377 4378 4379

7.3.4 Transient cerebral ischemia [112.]
4350 4351 4352 4353 4358 4359

7.3.5 Late effects of cerebrovascular disease [113.]
438 4380 43810 43811 43812 43813 43814 43819 43820 43821
43822 43830 43831 43832 43840 43841 43842 43850 43851 43852
43853 4386 4387 43881 43882 43883 43884 43885 43889 4389

Arterial Disease

7.4.1 Peripheral and visceral atherosclerosis [114.]

7.4.1.1 Atherosclerosis of arteries of extremities
4402 44020 44021 44022 44023 44029 4404

7.4.1.2 Peripheral vascular disease unspecified
4439

7.4.1.3 Other peripheral and visceral atherosclerosis
4400 4401 4408 4409 5570 5571 5579

7.4.2 Aortic; peripheral; and visceral artery aneurysms [115.]
44321 44322 44323 44324 44329

7.4.2.1 Abdominal aortic aneurysm; without rupture
4414 44772

7.4.2.2 Other aneurysm

4410 44100 44101 44102 44103 4411 4412 4413 4415 4416
4417 4419 4420 4421 4422 4423 44281 44282 44283 44284
44289 4429 44770 44771 44773

7.4.3 Aortic and peripheral arterial embolism or thrombosis [116.]

44501 44502 44581 44589

7.4.3.1 Arterial embolism and thrombosis of lower extremity artery

44422

7.4.3.2 Other arterial embolism and thrombosis

4440 44401 44409 4441 44421 44481 44489 4449

7.4.4 Other circulatory disease [117.]

7.4.4.1 Hypotension

4580 4581 4588 4589

7.4.4.2 Other and unspecified circulatory disease

4430 4431 44381 44382 44389 4460 4461 4462 44620 44621
44629 4463 4464 4465 4466 4467 4470 4471 4472 4473
4474 4475 4476 4478 4479 4480 4481 4489 4590 45989
4599 7859 79430 79431 79439 7962 V125 V1250 V1253 V1254
V1259 V151 V421 V432 V4321 V4322 V434 V717

Respiratory Infections and Disease

8.1 Respiratory infections

8.1.1 Pneumonia (except that caused by TB or STD) [122.]

8.1.1.1 Pneumococcal pneumonia

481

8.1.1.2 Other bacterial pneumonia

00322 0203 0204 0205 0212 0221 0310 0391 4820 4821
4822 4823 48230 48231 48232 48239 4824 48240 48241 48242
48249 4828 48281 48282 48283 48284 48289 4829

8.1.1.3 Pneumonia; organism unspecified

486

8.1.1.4 Other pneumonia

0521 0551 0730 0830 1124 1140 1144 1145 11505 11515
11595 1304 1363 4800 4801 4802 4803 4808 4809 483
4830 4831 4838 4841 4843 4845 4846 4847 4848 485
5130 5171

8.1.2 Influenza [123.]

4870 4871 4878 488 4880 48801 48802 48809 4881 48811
48812 48819 48881 48882 48889

8.1.3 Acute and chronic tonsillitis [124.]

463 4740 47400 47401 47402 47410 47411 47412 4742 4748
4749 475

8.1.4 Acute bronchitis [125.]
4660 4661 46611 46619

8.1.5 Other upper respiratory infections [126.]

8.1.5.1 Acute upper respiratory infections of multiple or unspecified sites
4658 4659

8.1.5.2 Chronic sinusitis
4730 4731 4732 4733 4738 4739 78491

8.1.5.3 Croup
4644

8.1.5.4 Other and unspecified upper respiratory infections
0320 0321 0322 0323 0340 460 4610 4611 4612 4613
4618 4619 462 4640 46400 46401 46410 46411 46420 46421
4630 46431 46450 46451 4650

8.8 Other lower respiratory disease [133.]

8.8.1 Postinflammatory pulmonary fibrosis
515

8.8.2 Painful respiration

78652

8.8.3 Other and unspecified lower respiratory disease
5131 514 5160 5161 5162 5163 51630 51631 51632 51633
51634 51635 51636 51637 5164 5165 51661 51662 51663 51664
51669 5168 5169 5172 5178 5183 5184 51889 5194 5198
5199 7825 78600 78601 78602 78603 78604 78605 78606 78607
78609 7862 7863 78630 78631 78639 7864 7866 7867 7868
7869 7931 79311 79319 7942 V126 V1260 V1261 V1269 V426

8.9 Other upper respiratory disease [134.]
470 4710 4711 4718 4719 4720 4721 4722 4760 4761
4770 4772 4778 4779 4780 4781 47811 47819 47820 47821
47822 47824 47825 47826 47829 47830 47831 47832 47833 47834
4784 4785 4786 47870 47871 47874 47875 47879 4788 4789
5191 51911 51919 5192 5193 7841 78440 78441 78442 78443
78444 78449 7847 7848 7849 78499 7861 V414 V440 V550

Chronic Obstructive Pulmonary Disease

8.2.1 Emphysema
4928

8.2.2 Chronic airway obstruction; not otherwise specified
496

8.2.3 Obstructive chronic bronchitis
4912 49120 49121 49122

8.2.4 Other chronic pulmonary disease
490 4910 4911 4918 4919 4920 494 4940 4941

Asthma

8.3 Asthma [128.]

8.3.1.1 Chronic obstructive asthma without status asthmaticus or exacerbation -
49320

8.3.1.2 Chronic obstructive asthma with status asthmaticus
49321

8.3.1.3 Chronic obstructive asthma with acute exacerbation
49322

8.3.2.1 Other asthma without status asthmaticus or exacerbation
49300 49310 49382 49390

8.3.2.2 Other asthma with status asthmaticus
49301 49311 49391

8.3.2.3 Other asthma with acute exacerbation
49302 49312 49381 49392

Non-Traumatic Joint Disorders

13.2.1 Rheumatoid arthritis and related disease [202.]
7140 7141 7142 71430 71431 71432 71433 7144 71481 71489
7149 7200

13.2.2 Osteoarthritis [203.]

13.2.2.1 Osteoarthritis; localized
71510 71511 71512 71513 71514 71515 71516 71517 71518 71520
71521 71522 71523 71524 71525 71526 71527 71528 71530 71531
71532 71533 71534 71535 71536 71537 71538

13.2.2.2 Osteoarthritis; generalized and unspecified
71500 71504 71509 71580 71589 71590 71591 71592 71593 71594
71595 71596 71597 71598 V134

13.2.3 Other non-traumatic joint disorders [204.]
7130 7131 7132 7133 7134 7135 7136 7137 7138 71600
71601 71602 71603 71604 71605 71606 71607 71608 71609 71620
71621 71622 71623 71624 71625 71626 71627 71628 71629 71630
71631 71632 71633 71634 71635 71636 71637 71638 71639 71640
71641 71642 71643 71644 71645 71646 71647 71648 71649 71650
71651 71652 71653 71654 71655 71656 71657 71658 71659 71660
71661 71662 71663 71664 71665 71666 71667 71668 71680 71681
71682 71683 71684 71685 71686 71687 71688 71689 71690 71691
71692 71693 71694 71695 71696 71697 71698 71699 71810 71811
71812 71813 71814 71815 71817 71818 71819 71820 71821 71822

71823 71824 71825 71826 71827 71828 71829 71850 71851 71852
71853 71854 71855 71856 71857 71858 71859 71860 71865 71870
71871 71872 71873 71874 71875 71876 71877 71878 71879 71880
71881 71882 71883 71884 71885 71886 71887 71888 71889 71890
71891 71892 71893 71894 71895 71897 71898 71899 71900 71901
71902 71903 71904 71905 71906 71907 71908 71909 71910 71911
71912 71913 71914 71915 71916 71917 71918 71919 71920 71921
71922 71923 71924 71925 71926 71927 71928 71929 71930 71931
71932 71933 71934 71935 71936 71937 71938 71939 71940 71941
71942 71943 71944 71945 71946 71947 71948 71949 71950 71951
71952 71953 71954 71955 71956 71957 71958 71959 71960 71961
71962 71963 71964 71965 71966 71967 71968 71969 7197 71970
71975 71976 71977 71978 71979 71980 71981 71982 71983 71984
71985 71986 71987 71988 71989 71990 71991 71992 71993 71994
71995 71996 71997 71998 71999

Injury

16.1 Joint disorders and dislocations; trauma-related [225.]

71610 71611 71612 71613 71614 71615 71616 71617 71618 71619
7170 7171 7172 7173 71740 71741 71742 71743 71749 7175
7176 7177 71781 71782 71783 71784 71785 71789 7179 71800
71801 71802 71803 71804 71805 71807 71808 71809 71830 71831
71832 71833 71834 71835 71836 71837 71838 71839 8300 8301
83100 83101 83102 83103 83104 83109 83110 83111 83112 83113
83114 83119 83200 83201 83202 83203 83204 83209 83210 83211
83212 83213 83214 83219 8322 83300 83301 83302 83303 83304
83305 83309 83310 83311 83312 83313 83314 83315 83319 83400
83401 83402 83410 83411 83412 83500 83501 83502 83503 83510
83511 83512 83513 8360 8361 8362 8363 8364 83650 83651
83652 83653 83654 83659 83660 83661 83662 83663 83664 83669
8370 8371 83800 83801 83802 83803 83804 83805 83806 83809
83810 83811 83812 83813 83814 83815 83816 83819 83900 83901
83902 83903 83904 83905 83906 83907 83908 83910 83911 83912
83913 83914 83915 83916 83917 83918 83920 83921 83930 83931
83940 83941 83942 83949 83950 83951 83952 83959 83961 83969
83971 83979 8398 8399 9056

16.2 Fractures

16.2.1 Fracture of neck of femur (hip) [226.]

82000 82001 82002 82003 82009 82010 82011 82012 82013 82019
82020 82021 82022 82030 82031 82032 8208 8209 9053 V5413
V5423

16.2.2 Skull and face fractures [228.]

80000 80001 80002 80003 80004 80005 80006 80009 80050 80051
80052 80053 80054 80055 80056 80059 80100 80101 80102 80103
80104 80105 80106 80109 80150 80151 80152 80153 80154 80155
80156 80159 8020 8021 80220 80221 80222 80223 80224 80225
80226 80227 80228 80229 80230 80231 80232 80233 80234 80235
80236 80237 80238 80239 8024 8025 8026 8027 8028 8029
80300 80301 80302 80303 80304 80305 80306 80309 80350 80351
80352 80353 80354 80355 80356 80359 80400 80401 80402 80403
80404 80405 80406 80409 80450 80451 80452 80453 80454 80455

80456 80459 9050

16.2.3 Fracture of upper limb [229.]

81345 V5410 V5411 V5412 V5420 V5421 V5422

16.2.3.1 Fracture of humerus

81200 81201 81202 81203 81209 81210 81211 81212 81213 81219
81220 81221 81230 81231 81240 81241 81242 81243 81244 81249
81250 81251 81252 81253 81254 81259

16.2.3.2 Fracture of radius and ulna

81300 81301 81302 81303 81304 81305 81306 81307 81308 81310
81311 81312 81313 81314 81315 81316 81317 81318 81320 81321
81322 81323 81330 81331 81332 81333 81340 81341 81342 81343
81344 81346 81347 81350 81351 81352 81353 81354 81380 81381
81382 81383 81390 81391 81392 81393

16.2.3.3 Other fracture of upper limb

81000 81001 81002 81003 81010 81011 81012 81013 81100 81101
81102 81103 81109 81110 81111 81112 81113 81119 81400 81401
81402 81403 81404 81405 81406 81407 81408 81409 81410 81411
81412 81413 81414 81415 81416 81417 81418 81419 81500 81501
81502 81503 81504 81509 81510 81511 81512 81513 81514 81519
81600 81601 81602 81603 81610 81611 81612 81613 8170 8171
8180 8181 8190 8191 9052

16.2.4 Fracture of lower limb [230.]

82340 82341 82342 V5414 V5415 V5416 V5424 V5425 V5426

16.2.4.1 Fracture of tibia and fibula

82300 82301 82302 82310 82311 82312 82320 82321 82322 82330
82331 82332 82380 82381 82382 82390 82391 82392

16.2.4.2 Fracture of ankle

8240 8241 8242 8243 8244 8245 8246 8247 8248 8249

16.2.4.3 Other fracture of lower limb

82100 82101 82110 82111 82120 82121 82122 82123 82129 82130
82131 82132 82133 82139 8220 8221 8250 8251 82520 82521
82522 82523 82524 82525 82529 82530 82531 82532 82533 82534
82535 82539 8260 8261 8270 8271 9054

16.2.5 Other fractures [231.]

V5417 V5419 V5427 V5429

16.2.5.1 Fracture of vertebral column without mention of spinal cord injury

80500 80501 80502 80503 80504 80505 80506 80507 80508 80510
80511 80512 80513 80514 80515 80516 80517 80518 8052 8053
8054 8055 8056 8057 8058 8059

16.2.5.2 Fracture of ribs; closed

80700 80701 80702 80703 80704 80705 80706 80707 80708 80709

16.2.5.3 Fracture of pelvis

8080 8081 8082 8083 80841 80842 80843 80844 80849 80851

80852 80853 80854 80859 8088 8089

16.2.5.4 Other and unspecified fracture

80710 80711 80712 80713 80714 80715 80716 80717 80718 80719
8072 8073 8074 8075 8076 8090 8091 8280 8281 8290
8291 9051 9055 V1352 V540 V5401 V5402 V5409 V664 V674

16.3 Spinal cord injury [227.]

34939 80600 80601 80602 80603 80604 80605 80606 80607 80608
80609 80610 80611 80612 80613 80614 80615 80616 80617 80618
80619 80620 80621 80622 80623 80624 80625 80626 80627 80628
80629 80630 80631 80632 80633 80634 80635 80636 80637 80638
80639 8064 8065 80660 80661 80662 80669 80670 80671 80672
80679 8068 8069 9072 95200 95201 95202 95203 95204 95205
95206 95207 95208 95209 95210 95211 95212 95213 95214 95215
95216 95217 95218 95219 9522 9523 9524 9528 9529

16.4 Intracranial injury [233.]

V1552

16.4.1 Concussion

8500 8501 85011 85012 8502 8503 8504 8505 8509

16.4.2 Other intracranial injury

80010 80011 80012 80013 80014 80015 80016 80019 80020 80021
80022 80023 80024 80025 80026 80029 80030 80031 80032 80033
80034 80035 80036 80039 80040 80041 80042 80043 80044 80045
80046 80049 80060 80061 80062 80063 80064 80065 80066 80069
80070 80071 80072 80073 80074 80075 80076 80079 80080 80081
80082 80083 80084 80085 80086 80089 80090 80091 80092 80093
80094 80095 80096 80099 80110 80111 80112 80113 80114 80115
80116 80119 80120 80121 80122 80123 80124 80125 80126 80129
80130 80131 80132 80133 80134 80135 80136 80139 80140 80141
80142 80143 80144 80145 80146 80149 80160 80161 80162 80163
80164 80165 80166 80169 80170 80171 80172 80173 80174 80175
80176 80179 80180 80181 80182 80183 80184 80185 80186 80189
80190 80191 80192 80193 80194 80195 80196 80199 80310 80311
80312 80313 80314 80315 80316 80319 80320 80321 80322 80323
80324 80325 80326 80329 80330 80331 80332 80333 80334 80335
80336 80339 80340 80341 80342 80343 80344 80345 80346 80349
80360 80361 80362 80363 80364 80365 80366 80369 80370 80371
80372 80373 80374 80375 80376 80379 80380 80381 80382 80383
80384 80385 80386 80389 80390 80391 80392 80393 80394 80395
80396 80399 80410 80411 80412 80413 80414 80415 80416 80419
80420 80421 80422 80423 80424 80425 80426 80429 80430 80431
80432 80433 80434 80435 80436 80439 80440 80441 80442 80443
80444 80445 80446 80449 80460 80461 80462 80463 80464 80465
80466 80469 80470 80471 80472 80473 80474 80475 80476 80479
80480 80481 80482 80483 80484 80485 80486 80489 80490 80491
80492 80493 80494 80495 80496 80499 85100 85101 85102 85103
85104 85105 85106 85109 85110 85111 85112 85113 85114 85115
85116 85119 85120 85121 85122 85123 85124 85125 85126 85129
85130 85131 85132 85133 85134 85135 85136 85139 85140 85141
85142 85143 85144 85145 85146 85149 85150 85151 85152 85153
85154 85155 85156 85159 85160 85161 85162 85163 85164 85165

85166 85169 85170 85171 85172 85173 85174 85175 85176 85179
85180 85181 85182 85183 85184 85185 85186 85189 85190 85191
85192 85193 85194 85195 85196 85199 85200 85201 85202 85203
85204 85205 85206 85209 85210 85211 85212 85213 85214 85215
85216 85219 85220 85221 85222 85223 85224 85225 85226 85229
85230 85231 85232 85233 85234 85235 85236 85239 85240 85241
85242 85243 85244 85245 85246 85249 85250 85251 85252 85253
85254 85255 85256 85259 85300 85301 85302 85303 85304 85305
85306 85309 85310 85311 85312 85313 85314 85315 85316 85319
85400 85401 85402 85403 85404 85405 85406 85409 85410 85411
85412 85413 85414 85415 85416 85419 9070

16.5 Crushing injury or internal injury [234.]

8600 8601 8602 8603 8604 8605 86100 86101 86102 86103
86110 86111 86112 86113 86120 86121 86122 86130 86131 86132
8620 8621 86221 86222 86229 86231 86232 86239 8628 8629
8630 8631 86320 86321 86329 86330 86331 86339 86340 86341
86342 86343 86344 86345 86346 86349 86350 86351 86352 86353
86354 86355 86356 86359 86380 86381 86382 86383 86384 86385
86389 86390 86391 86392 86393 86394 86395 86399 86400 86401
86402 86403 86404 86405 86409 86410 86411 86412 86413 86414
86415 86419 86500 86501 86502 86503 86504 86509 86510 86511
86512 86513 86514 86519 86600 86601 86602 86603 86610 86611
86612 86613 8670 8671 8672 8673 8674 8675 8676 8677
8678 8679 86800 86801 86802 86803 86804 86809 86810 86811
86812 86813 86814 86819 8690 8691 90000 90001 90002 90003
9001 90081 90082 90089 9009 9010 9011 9012 9013 90140
90141 90142 90181 90182 90183 90189 9019 9020 90210 90211
90219 90220 90221 90222 90223 90224 90225 90226 90227 90229
90231 90232 90233 90234 90239 90240 90241 90242 90249 90250
90251 90252 90253 90254 90255 90256 90259 90281 90282 90287
90289 9029 90300 90301 90302 9031 9032 9033 9034 9035
9038 9039 9040 9041 9042 9043 90440 90441 90442 90450
90451 90452 90453 90454 9046 9047 9048 9049 9064 9080
9081 9082 9083 9084 925 9251 9252 9260 92611 92612
92619 9268 9269 92700 92701 92702 92703 92709 92710 92711
92720 92721 9273 9278 9279 92800 92801 92810 92811 92820
92821 9283 9288 9289 9290 9299

16.6 Open wounds

16.6.1 Open wounds of head; neck; and trunk [235.]

8700 8701 8702 8703 8704 8708 8709 8710 8711 8712
8713 8714 8715 8716 8717 8719 87200 87201 87202 87210
87211 87212 87261 87262 87263 87264 87269 87271 87272 87273
87274 87279 8728 8729 8730 8731 87320 87321 87322 87323
87329 87330 87331 87332 87333 87339 87340 87341 87342 87343
87344 87349 87350 87351 87352 87353 87354 87359 87360 87361
87362 87363 87364 87365 87369 87370 87371 87372 87373 87374
87375 87379 8738 8739 87400 87401 87402 87410 87411 87412
8742 8743 8744 8745 8748 8749 8750 8751 8760 8761
8770 8771 8780 8781 8782 8783 8784 8785 8786 8787
8788 8789 8790 8791 8792 8793 8794 8795 8796 8797
8798 8799 9060

16.6.2 Open wounds of extremities [236.]

88000 88001 88002 88003 88009 88010 88011 88012 88013 88019
88020 88021 88022 88023 88029 88100 88101 88102 88110 88111
88112 88120 88121 88122 8820 8821 8822 8830 8831 8832
8840 8841 8842 8850 8851 8860 8861 8870 8871 8872
8873 8874 8875 8876 8877 8900 8901 8902 8910 8911
8912 8920 8921 8922 8930 8931 8932 8940 8941 8942
8950 8951 8960 8961 8962 8963 8970 8971 8972 8973
8974 8975 8976 8977 9058 9059 9061

16.7 Sprains and strains [232.]

8400 8401 8402 8403 8404 8405 8406 8407 8408 8409
8410 8411 8412 8413 8418 8419 84200 84201 84202 84209
84210 84211 84212 84213 84219 8430 8431 8438 8439 8440
8441 8442 8443 8448 8449 84500 84501 84502 84503 84509
84510 84511 84512 84513 84519 8460 8461 8462 8463 8468
8469 8470 8471 8472 8473 8474 8479 8480 8481 8482
8483 84840 84841 84842 84849 8485 8488 8489 9057

16.8 Superficial injury; contusion [239.]

9062 9063 9100 9101 9102 9103 9104 9105 9106 9107
9108 9109 9110 9111 9112 9113 9114 9115 9116 9117
9118 9119 9120 9121 9122 9123 9124 9125 9126 9127
9128 9129 9130 9131 9132 9133 9134 9135 9136 9137
9138 9139 9140 9141 9142 9143 9144 9145 9146 9147
9148 9149 9150 9151 9152 9153 9154 9155 9156 9157
9158 9159 9160 9161 9162 9163 9164 9165 9166 9167
9168 9169 9170 9171 9172 9173 9174 9175 9176 9177
9178 9179 9180 9181 9182 9189 9190 9191 9192 9193
9194 9195 9196 9197 9198 9199 920 9210 9211 9212
9213 9219 9220 9221 9222 9223 92231 92232 92233 9224
9228 9229 92300 92301 92302 92303 92309 92310 92311 92320
92321 9233 9238 9239 92400 92401 92410 92411 92420 92421
9243 9244 9245 9248 9249

16.9 Burns [240.]

9065 9066 9067 9068 9069 9400 9401 9402 9403 9404
9405 9409 94100 94101 94102 94103 94104 94105 94106 94107
94108 94109 94110 94111 94112 94113 94114 94115 94116 94117
94118 94119 94120 94121 94122 94123 94124 94125 94126 94127
94128 94129 94130 94131 94132 94133 94134 94135 94136 94137
94138 94139 94140 94141 94142 94143 94144 94145 94146 94147
94148 94149 94150 94151 94152 94153 94154 94155 94156 94157
94158 94159 94200 94201 94202 94203 94204 94205 94209 94210
94211 94212 94213 94214 94215 94219 94220 94221 94222 94223
94224 94225 94229 94230 94231 94232 94233 94234 94235 94239
94240 94241 94242 94243 94244 94245 94249 94250 94251 94252
94253 94254 94255 94259 94300 94301 94302 94303 94304 94305
94306 94309 94310 94311 94312 94313 94314 94315 94316 94319
94320 94321 94322 94323 94324 94325 94326 94329 94330 94331
94332 94333 94334 94335 94336 94339 94340 94341 94342 94343
94344 94345 94346 94349 94350 94351 94352 94353 94354 94355
94356 94359 94400 94401 94402 94403 94404 94405 94406 94407
94408 94410 94411 94412 94413 94414 94415 94416 94417 94418
94420 94421 94422 94423 94424 94425 94426 94427 94428 94430

94431 94432 94433 94434 94435 94436 94437 94438 94440 94441
94442 94443 94444 94445 94446 94447 94448 94450 94451 94452
94453 94454 94455 94456 94457 94458 94500 94501 94502 94503
94504 94505 94506 94509 94510 94511 94512 94513 94514 94515
94516 94519 94520 94521 94522 94523 94524 94525 94526 94529
94530 94531 94532 94533 94534 94535 94536 94539 94540 94541
94542 94543 94544 94545 94546 94549 94550 94551 94552 94553
94554 94555 94556 94559 9460 9461 9462 9463 9464 9465
9470 9471 9472 9473 9474 9478 9479 94800 94810 94811
94820 94821 94822 94830 94831 94832 94833 94840 94841 94842
94843 94844 94850 94851 94852 94853 94854 94855 94860 94861
94862 94863 94864 94865 94866 94870 94871 94872 94873 94874
94875 94876 94877 94880 94881 94882 94883 94884 94885 94886
94887 94888 94890 94891 94892 94893 94894 94895 94896 94897
94898 94899 9490 9491 9492 9493 9494 9495

16.10 Complications

16.10.1 Complication of device; implant or graft [237.]

41403 41405

16.10.1.1 Malfunction of device; implant; and graft

41402 41404 41407 44030 44031 44032 56960 56961 56969 59682
59683 99600 99601 99602 99603 99604 99609 9961 9962 99630
99631 99632 99639 9964 99640 99641 99642 99643 99644 99645
99646 99647 99649 99651 99652 99653 99654 99655 99656 99657
99659

16.10.1.2 Infection and inflammation--internal prosthetic device; implant; and graft

9966 99660 99661 99662 99663 99664 99665 99666 99667 99668
99669 99931 99932 99933

16.10.1.3 Other complications of internal prosthetic device; implant; and graft

62931 62932 9967 99670 99671 99672 99673 99674 99675 99676
99677 99678 99679

16.10.1.4 Complications of transplants and reattached limbs

27950 27951 27952 27953 99680 99681 99682 99683 99684 99685
99686 99687 99688 99689 99690 99691 99692 99693 99694 99695
99696 99699

16.10.2 Complications of surgical procedures or medical care [238.]

99524 99831 99832 V1553 V1580 V1583 V9001 V9009

16.10.2.1 Cardiac complications

4294 45821 45829 9971

16.10.2.2 Respiratory complications

5187 9973 99731 99732 99739

16.10.2.3 Gastrointestinal complications

53901 53909 53981 53989 5642 5643 5644 5696 56971 56979
5793 9974 99741 99749

16.10.2.4 Urinary complications

59681 9975

16.10.2.5 Hemorrhage or hematoma complicating a procedure
9981 99811 99812 99813

16.10.2.6 Postoperative infection
51901 53086 53641 99762 9985 99851 99859 9993

16.10.2.7 Other complications of surgical and medical procedures
27661 27783 27788 2853 28741 3490 3491 34931 41511 4582
5121 5122 5190 51900 51902 51909 53087 53640 53642 53649
56962 78062 78063 78066 9093 9954 99586 9970 99700 99701
99702 99709 9972 99760 99761 99769 99771 99772 99779 9979
99791 99799 9980 99800 99801 99802 99809 9982 9983 99830
99833 9984 9986 9987 9988 99881 99882 99883 99889 9989
9990 9991 9992 99934 99939 9994 99941 99942 99949 9995
99951 99952 99959 9996 99960 99961 99962 99963 99969 9997
99970 99971 99972 99973 99974 99975 99976 99977 99978 99979
9998 99980 99981 99982 99983 99984 99985 99988 99989 9999

16.11 Poisoning

16.11.1 Poisoning by psychotropic agents [241.]
9690 96900 96901 96902 96903 96904 96905 96909 9691 9692
9693 9694 9695 9696 9697 96970 96971 96972 96973 96979
9698 9699

16.11.2 Poisoning by other medications and drugs [242.]
52801 52802 9090 9095 9600 9601 9602 9603 9604 9605
9606 9607 9608 9609 9610 9611 9612 9613 9614 9615
9616 9617 9618 9619 9620 9621 9622 9623 9624 9625
9626 9627 9628 9629 9630 9631 9632 9633 9634 9635
9638 9639 9640 9641 9642 9643 9644 9645 9646 9647
9648 9649 9651 9654 9655 9656 96561 96569 9657 9658
9659 9660 9661 9662 9663 9664 9670 9671 9672 9673
9674 9675 9676 9678 9679 9680 9681 9682 9683 9684
9685 9686 9687 9689 9700 9701 9708 97081 97089 9709
9710 9711 9712 9713 9719 9720 9721 9722 9723 9724
9725 9726 9727 9728 9729 9730 9731 9732 9733 9734
9735 9736 9738 9739 9740 9741 9742 9743 9744 9745
9746 9747 9750 9751 9752 9753 9754 9755 9756 9757
9758 9760 9761 9762 9763 9764 9765 9766 9767 9768
9769 9770 9771 9772 9773 9774 9778 9779 9780 9781
9782 9783 9784 9785 9786 9788 9789 9790 9791 9792
9793 9794 9795 9796 9797 9799 9952 99520 99521 99522
99523 99527 99529

16.11.3 Poisoning by nonmedicinal substances [243.]
9091 9801 9802 9803 9808 9809 981 9820 9821 9822
9823 9824 9828 9830 9831 9832 9839 9840 9841 9848
9849 9850 9851 9852 9853 9854 9855 9856 9858 9859
986 9870 9871 9872 9873 9874 9875 9876 9877 9878
9879 9880 9881 9882 9888 9889 9890 9891 9892 9893
9894 9895 9896 9897 9898 98981 98982 98983 98984 98989
9899

16.12 Other injuries and conditions due to external causes [244.]

7960 7990 79901 79902 9071 9073 9074 9075 9079 9085
9086 9089 9092 9094 9099 9300 9301 9302 9308 9309
931 932 9330 9331 9340 9341 9348 9349 9350 9351
9352 936 937 938 9390 9391 9392 9393 9399 9500
9501 9502 9503 9509 9510 9511 9512 9513 9514 9515
9516 9517 9518 9519 9530 9531 9532 9533 9534 9535
9538 9539 9540 9541 9548 9549 9550 9551 9552 9553
9554 9555 9556 9557 9558 9559 9560 9561 9562 9563
9564 9565 9568 9569 9570 9571 9578 9579 9580 9581
9582 9583 9584 9585 9586 9587 9588 95890 95891 95892
95893 95899 9590 95901 95909 9591 95911 95912 95913 95914
95919 9592 9593 9594 9595 9596 9597 9598 9599 990
9910 9911 9912 9913 9914 9915 9916 9918 9919 9920
9921 9922 9923 9924 9925 9926 9927 9928 9929 9930
9931 9932 9933 9934 9938 9939 9940 9941 9942 9943
9944 9945 9946 9947 9948 9949 9955 99550 99551 99552
99553 99554 99555 99559 99580 99581 99582 99583 99584 99585
99589 99590 99593 99594 V155 V1551 V1559 V156 V1588 V713
V714 V716 V9010 V9011 V9012 V902 V9031 V9032 V9033 V9039
V9081 V9083 V9089 V909

Appendix A.3. Physician Provider Specialty Definition

Provider Specialty Type	Provider Claim Counts
Primary Care	
Family Medicine	3399
Family practice	2927
Family Practice	2262
Family Practice Specialist	1
General Practice	3134
General practice	312
Geriatric medicine	238
Geriatric Medicine	58
Hospice & Palliative Medicine	1
Hospice and Palliative Care	2
Internal Medicine	22059
Internal medicine	8741
Osteopathic Manipulative Medicine	7
Preventive Medicine	20
Preventive medicine	10
Preventive Medicine/Public Health	2
Medical Specialty	
Allergy	3
Allergy & Immunology	215
Allergy / Immunology	85
Allergy/immunology	142
Allergy/Immunology	39
Cardiology	6159
Cardiovascular Disease	563
Dermatology	3186
Endo, Diabetes & Metabolism	5
Endocrinology	664
Endocrinology And Metabolism	1
Endocrinology, Diabetes And Metabolism	34
Gastroenterology	1764
Gynecologic Oncology	9
Gynecological / Oncology	4
Gynecologist/oncologist	45
Gynecology	13

Provider Specialty Type	Provider Claim Counts
Gynecology (No Ob)	16
Hematology	183
Hematology / Oncology	121
Hematology/oncology	792
Infectious disease	492
Infectious Disease	117
Infectious Disease Medicine	1
Infectious Diseases	125
Maternal & Fetal Medicine	5
Maternal And Fetal Medicine	10
Maternal and Fetal Medicine	1
Medical oncology	342
Medical Oncology	43
Neonatal-Perinatal Medicine	3
Neonatology	17
Nephrology	904
Neurology	2303
Neurology With Special Qualifications In Child Neurology	3
Neuromusculoskeletal Medicine & OMM	15
Obstetrics	2
Obstetrics & Gynecology	2473
Obstetrics (No Gyn)	3
Obstetrics (osteopaths only)	19
Obstetrics and Gynecology	41
Obstetrics Gynecology	724
Obstetrics/gynecology	920
Obstetrics/Gynecology	531
Occupational Medicine	16
Oncology	26
Oncology - Gynecologic	2
Oncology/Hematology	1
Ophthalmology	3918
Ophthalmology, otology, laryngology, rhinology (osteopaths only)	39

Provider Specialty Type	Provider Claim Counts
Otolaryngology	1568
Otolaryngology (Ear, Nose, And Throat)	83
Pediatric Cardiology	3
Pediatric Emergency Medicine	1
Pediatric Endocrinology	1
Pediatric Medicine	284
Pediatric medicine	178
Pediatric Neurology	1
Pediatric Radiology	3
Pediatrics	523
Pulmonary disease	1025
Pulmonary Disease	521
Radiation oncology	324
Radiation Oncology	81
Reproductive Endocrinology	33
Reproductive Endocrinology/Infertility	12
Rheumatology	572
Sleep Medicine	1
Urology	1980
Surgical Specialty	
Cardiac surgery	98
Colon & Rectal Surgery	96
Colorectal surgery (formerly proctology)	93
Colorectal Surgery (Formerly Proctology)	20
Colorectal Surgery (formerly proctology)	6
General surgery	1011
General Surgery	685
Hand surgery	125
Hand Surgery	43
Maxillofacial surgery	16
Maxillofacial Surgery	1
Neurological Surgery	289
Neurosurgery	410
Oral & Maxillofacial Surgery	84
Orthopaedic Surgery	1977

Provider Specialty Type	Provider Claim Counts
Orthopedic surgery	1863
Orthopedic Surgery	1103
Plastic and reconstructive surgery	179
Plastic And Reconstructive Surgery	98
Plastic and Reconstructive Surgery	20
Plastic Surgery	158
Surgery	1732
Surgery - General	10
Surgery - Neurological	2
Surgery - Orthopedic	24
Surgery - Vascular	6
Surgery, Cardiovascular	4
Surgery, Colon And Rectal	10
Surgery, General	155
Surgery, Hand	21
Surgery, Head And Neck	2
Surgery, Neurological	68
Surgery, Oral And Maxillofacial	18
Surgery, Oral-Maxillofacial	4
Surgery, Orthopaedic	188
Surgery, Orthopedic	236
Surgery, Plastic	51
Surgery, Thoracic	32
Surgery, Vascular	29
Surgical oncology	83
Thoracic surgery	139
Thoracic Surgery	77
Thoracic Surgery (Cardiothoracic Vascular Surgery)	168
Transplant Surgery	30
Vascular surgery	285
Vascular Surgery	29
Other Provider Types	
Acupuncture	90
Acupuncturist	50
Acute Care Nurse Practitioner	1
Addiction Medicine	23

Provider Specialty Type	Provider Claim Counts
Adult Nurse Practitioner	15
Advanced Practice Midwife	159
Aerospace Medicine	1
Alcohol Treat Hosp	19
All other suppliers	30
All other suppliers, e.g., Drug Stores	4
Alzheimer Center (Dementia Center)	1
Ambulance	895
Ambulance Service Provider	219
Ambulance service supplier	1204
Ambulance Service Supplier	513
Ambulance Service Supplier, e.g., private ambulance companies, funeral homes	111
Ambulatory Surgical Center	81
Ambulatory surgical center (formerly miscellaneous)	362
Anatomic Pathology	10
Anesthesia, Certified Rn	46
Anesthesiologist Assistant	5
Anesthesiologist Assistants	19
Anesthesiology	6161
Assisted Living Facility	44
Audiologist	125
Audiologist (billing independently)	239
Audiologist-Hearing Aid Fitter	10
Audiology	16
Behavioral Analyst	2
Behavioral Health Facility/Clinic	31
Behavioral Health Provider Group	20
Behavioral Medicine	1
Cardiac Electrophysiology	4
Case Management	18
Case Manager/Care Coordinator	20
Cert Asthma Educators	2
Certified Clinical Nurse Specialist	308
Certified clinical nurse specialist	252

Provider Specialty Type	Provider Claim Counts
Certified nurse midwife	89
Certified Nurse Midwife	75
Certified Nurse Midwife (effective July 1, 1988)	15
Certified Registered Nurse Anesthetist (CRNA)	1
Certified Rn Anesthetist, Anesthesia Assistant	305
Chiropractic	2209
Chiropractic Medicine	12
Chiropractor	902
Chronic Disease Hospital	3
Clinic/Center	2350
Clinical Cardiac Electrophysiology	5
Clinical Cytogenetics	3
Clinical Genetics	7
Clinical laboratory (billing independently)	856
Clinical Laboratory (Billing Independently)	91
Clinical Medical Laboratory	596
Clinical Neuropsychologist	62
Clinical Nurse Specialist	118
Clinical Pathology	109
Clinical psychologist	666
Clinical Psychologist	5
Clinical Psychologist (Billing Independently)	76
Community Based Residential Treatment Facility, Mental Retardation and/or Developmental Disabilities	16
Community Health Worker	1
Community/Behavioral Health	85
Contractor	3
Counseling	100
Counselor	735
Critical Care	12
Critical Care (Intensivists)	484
Critical care (intensivists)	180
Critical Care Medicine	16

Provider Specialty Type	Provider Claim Counts
CRNA	1681
Crnfa/ Rnfa	5
Custodial Care Facility	2
Cytopathology	5
Day Training, Developmentally Disabled Services	62
Dentist	362
Dentistry	13
Dentistry, General	10
Department store	5
Dermatopathology	18
Diabetes Educator	12
Diagnostic Lab Immunology	2
Diagnostic radiology	7453
Diagnostic Radiology	3090
Dietitian, Registered	145
DME Technology	230
Doula	1
Durable Medical Equipment	83
Durable Medical Equipment & Medical Supplies	999
Emergency Medical Technician, Basic	638
Emergency Medical Technician, Intermediate	1
Emergency Medical Technician, Paramedic	119
Emergency Medicine	4744
Emergency medicine	4180
Emergency Medicine - Staff	10
Emergency Response System Companies	3
Endodontics	39
Endodontists	4
Exclusive Provider Organization	2
Eyewear Supplier (Equipment, not the service)	11
Facility	150
Family Nurse Practitioner	58
Family Nurse Practitioner Primary Care	1

Provider Specialty Type	Provider Claim Counts
Family Planning	2
General Acute Care Hospital	1880
General Dentist	84
Genetic Counselor, MS	1
Genetics	8
Gerontological Nurse Practitioner	2
Hearing Aid Equipment	3
Hearing Instrument Specialist	6
Home Delivered Meals	1
Home Health	511
Home Health Agency	146
Home Health Aide	72
Home Infusion	265
Hospice	8
Hospice Care - Staff	8
Hospice Care, Community Based	31
Hospital	2078
Hospital Inpatient	53
Hospital/Facility	129
Hospitalist	678
In Home Supportive Care	6
Independ. Practicing Occupational Therapist	95
Independent Billing Psychologist	659
Independent Diagnostic Testing Facility (IDTF)	376
Independently Billing Audiologist	70
Independently Billing Clinical Laboratory	526
Independently Practicing Physical Therapist	1041
Indirect Payment Procedure	2
Individual certified orthotist	60
Individual certified prosthetist	52
Individual certified prosthetist-orthotist	1
Intermediate Care Facility, Mentally Retarded	1
Interventional Cardiology	3
Interventional Pain Management	155

Provider Specialty Type	Provider Claim Counts
Interventional radiology	140
Ip Facility	274
Lab	66
Laboratories	99
Laboratory	165
Legal Medicine	33
Licensed Clinical Social Worker	1062
Licensed clinical social worker	967
Licensed Practical Nurse	3
Local Education Agency (LEA)	32
Long Term Care Hospital	11
Mammography screening center	5
Marriage & Family Therapist	379
Marriage/ Family Therapist	107
Mass Immunization Roster Biller	772
Massage Therapist	6
Med Supply Co. W/Cert. Prosthetist Orthotist	37
Medical Genetics	13
Medical Genetics, Ph.D. Medical Genetics	2
Medical Professional	5216
Medical Supply Company Not 51, 52, Or 53	559
Medical supply company not included in 51, 52, or 53	102
Medical supply company not included in 51, 52, or 53.	838
Medical supply company with certified orthotist (53
Medical supply company with certified prosthetist	8
Medical supply company with certified prosthetist-orthotist (certified by American Board	40
Medical Supply Company with Pedorthic Personnel	14
Medical supply company with respiratory therapist (DMERCs only)	161
Medical supply Individuals not included in 55, 56, or 57	1
Medicare Defined Swing Bed Unit	15
Mental Health Counselor	457

Provider Specialty Type	Provider Claim Counts
Midwife	77
Midwife, Lay	1
Midwifery	31
Military Clinical Medical Laboratory	3
Multi Specialty Clinic Or Group Practice	54
Multi Specialty Physician Group	12
Multi-Specialty	478
Multispecialty clinic or group practice	234
Multispecialty Group	75
Naprapath	1
Naturopath	31
Naturopathic Medicine	2
Neuromusculoskeletal Medicine, Sports Medicine	16
Neuropsychiatry	36
Non-emergency Medical Transport (VAN)	11
Np/ Dermatology	14
Np/ Obgyn	32
Np/ Oncology	19
Np/ Pcp	410
Np/ Specialist	392
Nuclear Medicine	95
Nuclear medicine	88
Nurse - Midwife	2
Nurse - Practitioner	4
Nurse Anesthetist, Certified Registered	157
Nurse practitioner	2884
Nurse Practitioner	1554
Nurse Practitioner - Family Pr	2
Nurse Specialist	55
Nursing Care	24
Nursing Facility/Intermediate Care Facility	12
Nutrition	55
Nutritionist	117
Occupat Health Center	2

Provider Specialty Type	Provider Claim Counts
Occupational therapist	168
Occupational Therapist	106
Occupational Therapist in Private Practice	30
Occupational Therapy	30
Occupational Therapy Assistant	1
Op Mental Health	16
Optician	106
Optometrist	1755
Optometry	2367
Oral surgery (dentists only)	98
Oral Surgery (Dentists Only)	50
Oral Surgery (dentists only)	20
Orthodontists	130
Orthotics And Prosthetics	6
Orthotist	2
Osteopathic manipulative therapy	46
Osteopathic Manipulative Therapy	14
Other	1
Other Behavioral Health	3
Pa/ Allergy	3
Pa/ Behavioral Health	3
Pa/ Dermatology	18
Pa/ Obgyn	3
Pa/ Oncology	1
Pa/ Spcp	236
Pa/ Specialist	33
Pain Management	133
Pain Medicine	55
Palliative Medicine	1
Path, Anatomic and Clinical	5
Pathologic anatomy, clinical pathology (osteopaths only)	184
Pathology	3829
Pathology - Anatomic and Clini	4
Pathology, Anatomic	30
Pathology, Anatomic And Clinical	59
Pathology, Clinical	4

Provider Specialty Type	Provider Claim Counts
Pathology, Medical Microbiology	2
Pedodontists	3
Pedorthic Personnel	1
Periodontist	21
Peripheral vascular disease	4
Peripheral Vascular Disease	3
Peripheral vascular disease, medical or surgical (osteopaths only)	33
Personal Emergency Response Attendant	11
Pharmacist	22
Pharmacy	155
Pharmacy (DMERCs only)	920
Phlebology	1
Physical Medicine	92
Physical Medicine & Rehabilitation	331
Physical medicine and rehabilitation	516
Physical Medicine And Rehabilitation	228
Physical Medicine and Rehabilitation	48
Physical Therapist	1679
Physical therapist	1439
Physical Therapist in Private Practice	391
Physical Therapy	310
Physical Therapy Assistant	2
Physician assistant	2333
Physician Assistant	1422
Physician'S Assistant	2
Physiological Laboratory	49
Podiatrist	1151
Podiatry	2239
Portable X-ray supplier	102
Portable X-Ray Supplier	33
Portable X-Ray Supplier (Billing Independently)	1
Prosthetic/Orthotic Supplier	59
Prosthodontists	1

Provider Specialty Type	Provider Claim Counts
Psychiatric Hosp	46
Psychiatric Hospital	99
Psychiatric Residential Treatment Facility	3
Psychiatric Unit	78
Psychiatry	2833
Psychiatry & Neurology	3191
Psychiatry, Geriatric	3
Psychiatry, neurology (osteopaths only)	25
Psychoanalyst	1
Psychologist	832
Psychologist (billing independently)	8
Psychology	182
Public Health or Welfare	10
Public Health Or Welfare Agencies	12
Public health or welfare agencies	8
Radiation Therapy Centers	4
Radiologic Technologist	5
Radiology	4560
Radiology - Diagnostic	6
Radiology - Vascular & Interve	2
Radiology, Diagnostic	367
Radiology, Nuclear	1
Radiology,Diagnostic	543
Registered Dietician/Nutrition Professional	297
Registered Nurse	470
Rehab Hospital	24
Rehabilitation Hospital	32
Rehabilitation Practitioner	83
Rehabilitation Unit	29
Rehabilitation, Substance Use Disorder Unit	10
Renal Facility	57
Residential Treatment Facility, Emotionally Disturbed Children	15
Residential Treatment Facility, Mental Retardation and/or Developmental Disabilities	3

Provider Specialty Type	Provider Claim Counts
Residential Treatment Facility, Physical Disabilities	1
Respiratory Therapist, Certified	1
Respiratory Therapist, Registered	1
Respiratory Therapy	1
Respite Care	2
Single or Multispecialty Clinic or Group Practice	81
Single Specialty	388
Skilled Nursing Facility	799
Slide Preparation Facilities	2
Social Work	331
Social Worker	2081
Special Hospital	14
Specialist	1285
Specialist/Technologist	3
Specialist/Technologist Cardiovascular	8
Specialist/Technologist, Other	1
Speech Language Pathologists	8
Speech Pathologist	12
Speech Therapy	1
Speech-Language Pathologist	18
Sports Medicine	8
Sterility - Fertility	2
Student in an Organized Health Care Education/Training Program	203
Sub Abuse Trt Fac	13
Submitter supplied an invalid value.	134
Substance Abuse Rehabilitation Facility	76
Supplier of oxygen and/or oxygen related equipment	8
Surgical Assistance	1
Surgical Critical Care	4
Technician, Cardiology	2
Technician, Pathology	3
Technician/Technologist	40
Therapy - Occupational	2
Therapy - Physical	22

Provider Specialty Type	Provider Claim Counts
Therapy - Respiratory	1
Therapy, Occupational	4
Therapy, Physical	124
Therapy, Speech	2
Unknown	42
Unknown Physician Specialty	8450
Unknown physician specialty	51
Unknown Specialty - Other	4
Unknown Specialty Other	559
Unknown Supplier/Provider	116
Unknown supplier/provider specialty	9
Urgent Care	174
Urgent Care - San Diego	14
Urgent Care - Staff	20
Urgent Care Center	22
Vascular & Interventional Radiology	5
Visiting Nurse	21
Visiting Nurse Assoc	1
Voluntary or Charitable	1
Women's Health Care Nurse Practitioner	3

Appendix B: Expenditure Summary by LTSS User Type and Payer Prior to LTSS

Table B.1. Service Utilization and Spending in the 30 Days Prior to LTSS Entry, Medicare-Only

	Facility First	Facility Only	HCBS First	HCBS Only	Total
Beneficiaries	969	296	2,769	19,830	23,864
Total Expenditures (000s)	\$13,035	\$341	\$4,500	\$62,031	\$79,906
Expenditures Per Beneficiary	\$13,452 (\$13,537)	\$1,151 (\$6,022)	\$1,625 (\$6,354)	\$3,128 (\$9,403)	\$3,348 (\$9,634)
Inpatient Utilization					
0 Inpatient Admissions (%)	29%	94%	91%	85%	84%
1 Inpatient Admission (%)	61%	5%	7%	12%	14%
2+ Inpatient Admissions (%)	10%	1%	1%	2%	3%
Mean Inpatient Bed Days (SD)	6.7 (4.3)	7.1 (4.5)	6.9 (4.8)	6.1 (4.4)	6.3 (4.4)
Total Inpatient Expenditures (000s)	\$11,126	\$224	\$2,783	\$43,096	\$57,229
Mean Inpatient Expenditures (SD)	\$16,195 (\$11,762)	\$14,008 (\$17,072)	\$11,943 (\$12,128)	\$15,032 (\$13,110)	\$15,048 (\$12,864)
ER Utilization					
0 ER Visits (%)	95%	98%	94%	92%	93%
1 ER Visit (%)	4%	2%	5%	6%	6%
2+ ER Visits	1%	0%	1%	1%	1%
Total ER Expenditures (000s)	\$64	\$5	\$150	\$1,606	\$1,825
Mean ER Expenditures (SD)	\$270 (\$589)	\$821 (\$643)	\$527 (\$682)	\$670 (\$903)	\$624 (\$869)
ER and Inpatient Stay (%)	23%	1%	5%	6%	7%
Any Outpatient Use (%)	51%	8%	29%	31%	31%
Total Outpatient Expenditures (000s)	\$178	\$4	\$508	\$5,982	\$6,672
Mean Outpatient Expenditures (SD)	\$361 (\$765)	\$157 (\$278)	\$641 (\$2,042)	\$976 (\$2,809)	\$897 (\$2,649)
Any Primary Care Visits (%)	57%	8%	38%	44%	43%
Total Primary Care Expenditures (000s)	\$195	\$4	\$198	\$2,054	\$2,450
Mean Primary Care Expenditures (SD)	\$354 (\$365)	\$170 (\$180)	\$189 (\$264)	\$237 (\$556)	\$238 (\$525)
Any Specialty Provider Visits (%)	72%	9%	41%	43%	43%
Total Specialty Provider Expenditures (000s)	\$966	\$17	\$472	\$5,289	\$6,745
Mean Specialty Provider Expenditures (SD)	\$1,376 (\$1,062)	\$622 (\$1,564)	\$420 (\$739)	\$621 (\$1,067)	\$650 (\$1,058)
Any DME (%)	9%	3%	12%	10%	10%
Total DME Expenditures (000s)	\$11	\$1	\$46	\$333	\$391
Mean DME Expenditures (SD)	\$136 (\$149)	\$143 (\$69)	\$143 (\$212)	\$163 (\$514)	\$159 (\$476)
Any Other Utilization (%)	86%	71%	57%	58%	59%
Total Other Expenditures (000s)	\$495	\$85	\$343	\$3,672	\$4,594
Mean Other Expenditures (SD)	\$591 (\$1,620)	\$406 (\$1,049)	\$217 (\$438)	\$321 (\$689)	\$327 (\$766)

Table B.2. Service Utilization and Spending in the 30 Days Prior to LTSS Entry, Medicaid-Only

	Facility First	Facility Only	HCBS First	HCBS Only	Total
Beneficiaries	47	57	101	7,126	7,331
Total Expenditures (000s)	\$368	\$67	\$389	\$11,439	\$12,263
Expenditures Per Beneficiary	\$7,822 (\$20,928)	\$1,175 (\$4,890)	\$3,854 (\$11,850)	\$1,605 (\$6,868)	\$1,673 (\$7,146)
Inpatient Utilization					
0 Inpatient Admissions (%)	70%	68%	82%	99%	93%
1 Inpatient Admission (%)	23%	7%	14%	1%	1%
2+ Inpatient Admissions (%)	6%	25%	4%	0%	5%
Mean Inpatient Bed Days (SD)	11.2 (9.4)	16.8 (9.9)	7.4 (6.2)	6.2 (4.9)	6.4 (5.3)
Total Inpatient Expenditures (000s)	\$328	\$39	\$292	\$6,145	\$6,804
Mean Inpatient Expenditures (SD)	\$23,444 (\$23,163)	\$12,959 (\$5,916)	\$16,215 (\$15,373)	\$13,965 (\$14,833)	\$14,323 (\$15,160)
ER Utilization					
0 ER Visits (%)	96%	96%	88%	84%	85%
1 ER Visit (%)	4%	4%	5%	12%	11%
2+ ER Visits	0%	0%	7%	4%	4%
Total ER Expenditures (000s)	<\$1	\$3	\$10	\$951	\$965
Mean ER Expenditures (SD)	\$230 (\$332)	\$1,458 (\$948)	\$512 (\$574)	\$786 (\$840)	\$781 (\$836)
ER and Inpatient Stay (%)	4%	0%	12%	3%	3%
Any Outpatient Use (%)	21%	2%	28%	26%	26%
Total Outpatient Expenditures (000s)	\$7	<1	\$13	\$1,487	\$1,506
Mean Outpatient Expenditures (SD)	\$677 (\$1080)	\$27 (.)	\$456 (\$870)	\$811 (\$2,582)	\$805 (\$2,558)
Any Primary Care Visits (%)	36%	5%	23%	21%	21%
Total Primary Care Expenditures (000s)	\$5	<\$1	\$9	\$255	\$269
Mean Primary Care Expenditures (SD)	\$273 (\$288)	\$106 (\$177)	\$372 (\$635)	\$173 (\$356)	\$177 (\$361)
Any Specialty Provider Visits (%)	26%	5%	13%	12%	12%
Total Specialty Provider Expenditures (000s)	\$13	\$3	\$14	\$451	\$481
Mean Specialty Provider Expenditures (SD)	\$1,105 (\$1,171)	\$1,060 (\$635)	\$1,074 (\$1,681)	\$540 (\$963)	\$558 (\$982)
Any DME (%)	6%	0%	10%	6%	6%
Total DME Expenditures (000s)	<\$1	\$0	\$1	\$91	\$92
Mean DME Expenditures (SD)	\$180 (\$230)	\$0	\$110 (\$84)	\$222 (\$420)	\$219 (\$414)
Any Other Utilization (%)	49%	39%	52%	60%	60%
Total Other Expenditures (000s)	\$13	\$22	\$51	\$2,060	\$2,145
Mean Other Expenditures (SD)	\$578 (\$532)	\$985 (\$1,605)	\$958 (\$1,415)	\$479 (\$1,189)	\$488 (\$1,193)

Table B.3. Service Utilization and Spending in the 30 Days Prior to LTSS Entry, Medicare and Medicaid

	Facility First	Facility Only	HCBS First	HCBS Only	Total
Beneficiaries	173	146	448	4,630	5,397
Total Expenditures (000s)	\$1,502	\$313	\$670	\$7,189	\$9,673
Expenditures Per Beneficiary	\$8,682 (\$11,574)	\$2,143 (\$3,500)	\$1,495 (\$4,449)	\$1,553 (\$5,215)	\$1,792 (\$5,673)
Inpatient Utilization					
0 Inpatient Admissions (%)	54%	98%	93%	92%	91%
1 Inpatient Admission (%)	10%	1%	3%	3%	3%
2+ Inpatient Admissions (%)	36%	1%	4%	5%	5%
Mean Inpatient Bed Days (SD)	6.9 (5.1)	8.4 (3.6)	8.3 (9.2)	5.6 (4.3)	6.0 (5.0)
Total Inpatient Expenditures (000s)	\$1,151	\$37	\$236	\$3,804	\$5,228
Mean Inpatient Expenditures (SD)	\$14,754 (\$10,550)	\$12,234 (\$13,734)	\$9,082 (\$9,669)	\$11,598 (\$9,716)	\$12,018 (\$9,956)
ER Utilization					
0 ER Visits (%)	95%	100%	94%	89%	90%
1 ER Visit (%)	0%	0%	2%	3%	3%
2+ ER Visits	5%	0%	4%	8%	7%
Total ER Expenditures (000s)	\$8	<\$1	\$23	\$351	\$382
Mean ER Expenditures (SD)	\$234 (\$251)	\$104 (\$17)	\$652 (\$816)	\$596 (\$760)	\$579 (\$749)
ER and Inpatient Stay (%)	18%	1%	3%	3%	4%
Any Outpatient Use (%)	32%	5%	26%	32%	31%
Total Outpatient Expenditures (000s)	\$21	\$3	\$95	\$806	\$924
Mean Outpatient Expenditures (SD)	\$366 (\$572)	\$388 (\$593)	\$805 (\$1,819)	\$540 (\$1,610)	\$552 (\$1,600)
Any Primary Care Visits (%)	37%	3%	27%	33%	32%
Total Primary Care Expenditures (000s)	\$29	<\$1	\$34	\$273	\$337
Mean Primary Care Expenditures (SD)	\$457 (\$510)	\$116 (\$73)	\$281 (\$1,180)	\$178 (\$273)	\$195 (\$420)
Any Specialty Provider Visits (%)	48%	7%	28%	30%	29%
Total Specialty Provider Expenditures (000s)	\$110	\$2	\$35	\$569	\$716
Mean Specialty Provider Expenditures (SD)	\$1,324 (\$1,298)	\$207 (\$261)	\$274 (\$463)	\$417 (\$754)	\$451 (\$799)
Any DME (%)	10%	3%	11%	13%	12%
Total DME Expenditures (000s)	\$2	<\$1	\$10	\$84	\$97
Mean DME Expenditures (SD)	\$121 (\$164)	\$233 (\$160)	\$204 (\$255)	\$142 (\$219)	\$147 (\$221)
Any Other Utilization (%)	87%	88%	61%	63%	65%
Total Other Expenditures (000s)	\$182	\$269	\$236	\$1,302	\$1,989
Mean Other Expenditures (SD)	\$1,203 (\$1,797)	\$2,104 (\$2,537)	\$866 (\$1,592)	\$444 (\$945)	\$571 (\$1,203)

Table B.4. Service Utilization and Spending in the 30 Days Prior to LTSS Entry, Commercial

	Facility First	Facility Only	HCBS First	HCBS Only	Total
Beneficiaries	36	10	53	12,024	12,123
Total Expenditures (000s)	\$674	<\$1	\$347	\$54,475	\$55,497
Expenditures Per Beneficiary	\$18,730 (\$14,415)	\$80 (\$116)	\$6,548 (\$15,762)	\$4,530 (\$16,438)	\$4,578 (\$16,440)
Inpatient Utilization					
0 Inpatient Admissions (%)	14%	100%	81%	87%	87%
1 Inpatient Admission (%)	75%	0%	17%	12%	12%
2+ Inpatient Admissions (%)	11%	0%	2%	1%	1%
Mean Inpatient Bed Days (SD)	7.1 (6.7)	0.0 (0.0)	11.0 (7.6)	5.6 (4.5)	5.7 (4.6)
Total Inpatient Expenditures (000s)	\$583	\$0	\$198	\$35,807	\$36,588
Mean Inpatient Expenditures (SD)	\$18,809 (\$12,878)	\$0	\$19,795 (\$22,904)	\$24,161 (\$22,582)	\$24,023 (\$22,434)
ER Utilization					
0 ER Visits (%)	97%	100%	91%	92%	92%
1 ER Visit (%)	3%	0%	9%	6%	6%
2+ ER Visits	0%	0%	0%	1%	1%
Total ER Expenditures (000s)	\$1	\$0	\$14	\$1,628	\$1,643
Mean ER Expenditures (SD)	\$1,006 (.)	\$0	\$1,691 (\$3,568)	\$1,418 (\$2,466)	\$1,420 (\$2,472)
ER and Inpatient Stay (%)	3%	0%	8%	4%	4%
Any Outpatient Use (%)	61%	10%	42%	27%	27%
Total Outpatient Expenditures (000s)	\$4	<\$1	\$71	\$6,522	\$6,597
Mean Outpatient Expenditures (SD)	\$187 (\$179)	\$176 (.)	\$3,239 (\$7,830)	\$2,032 (\$5,103)	\$2,027 (\$5,110)
Any Primary Care Visits (%)	58%	20%	36%	31%	31%
Total Primary Care Expenditures (000s)	\$3	\$236	\$6	\$832	\$841
Mean Primary Care Expenditures (SD)	\$145 (\$115)	\$118 (\$44)	\$308 (\$411)	\$222 (\$506)	\$222 (\$504)
Any Specialty Provider Visits (%)	86%	0%	36%	31%	31%
Total Specialty Provider Expenditures (000s)	\$55	\$0	\$15	\$4,562	\$4,631
Mean Specialty Provider Expenditures (SD)	\$1,768 (\$1,138)	\$0	\$790 (\$987)	\$1,220 (\$2,361)	\$1,222 (\$2,350)
Any DME (%)	6%	0%	15%	6%	6%
Total DME Expenditures (000s)	\$78	\$0	\$24	\$221	\$245
Mean DME Expenditures (SD)	\$39 (\$30)	\$0	\$2,936 (\$8,062)	\$329 (\$1,447)	\$359 (\$1,677)
Any Other Utilization (%)	94%	50%	60%	50%	50%
Total Other Expenditures (000s)	\$28	<\$1	\$20	\$4,903	\$4,952
Mean Other Expenditures (SD)	\$827 (\$979)	\$77 (\$62)	\$623 (\$1,090)	\$816 (\$1,948)	\$814 (\$1,940)

Table B.5. Service Utilization and Spending in the 30 Days Prior to LTSS Entry, Age <65

	Facility First	Facility Only	HCBS First	HCBS Only	Total
Beneficiaries	119	52	293	22,476	22,940
Total Expenditures (000s)	\$1,635	\$56	\$1,205	\$70,407	\$73,304
Expenditures Per Beneficiary	\$13,739 (\$15,631)	\$1,082 (\$4,065)	\$4,113 (\$10,384)	\$3,133 (\$12,618)	\$3,195 (\$12,635)
Inpatient Utilization					
0 Inpatient Admissions (%)	37%	96%	82%	90%	90%
1 Inpatient Admission (%)	39%	4%	13%	8%	9%
2+ Inpatient Admissions (%)	24%	0%	5%	1%	2%
Mean Inpatient Bed Days (SD)	7.3 (5.9)	23.0 (9.9)	7.8 (8.1)	5.8 (4.6)	5.9 (4.8)
Total Inpatient Expenditures (000s)	\$1,357	\$26	\$803	\$44,177	\$46,362
Mean Inpatient Expenditures (SD)	\$18,097 (\$14,080)	\$13,087 (\$8,360)	\$15,432 (\$14,151)	\$20,576 (\$20,574)	\$20,370 (\$20,274)
ER Utilization					
0 ER Visits (%)	96%	96%	89%	89%	89%
1 ER Visit (%)	3%	4%	7%	8%	8%
2+ ER Visits	2%	0%	4%	3%	3%
Total ER Expenditures (000s)	\$12	\$3	\$44	\$2,823	\$2,882
Mean ER Expenditures (SD)	\$683 (\$1,911)	\$1,458 (\$948)	\$776 (\$1,585)	\$979 (\$1,618)	\$974 (\$1,618)
ER and Inpatient Stay (%)	232%	17%	56%	10%	12%
Any Outpatient Use (%)	48%	6%	33%	27%	27%
Total Outpatient Expenditures (000s)	\$30	<\$1	\$105	\$8,594	\$8,730
Mean Outpatient Expenditures (SD)	\$528 (\$1,200)	\$72 (\$90)	\$1,095 (\$2,872)	\$1,411 (\$4,056)	\$1,398 (\$4,023)
Any Primary Care Visits (%)	50%	8%	28%	28%	28%
Total Primary Care Expenditures (000s)	\$19	<\$1	\$31	\$1,270	\$1,321
Mean Primary Care Expenditures (SD)	\$326 (\$462)	\$169 (\$127)	\$379 (\$549)	\$203 (\$393)	\$206 (\$397)
Any Specialty Provider Visits (%)	65%	6%	35%	24%	25%
Total Specialty Provider Expenditures (000s)	\$140	\$3	\$69	\$5,282	\$5,493
Mean Specialty Provider Expenditures (SD)	\$1,817 (\$1,437)	\$1,060 (\$635)	\$659 (\$909)	\$963 (\$2,013)	\$969 (\$1,994)
Any DME (%)	12%	2%	17%	7%	7%
Total DME Expenditures (000s)	\$3	<\$1	\$33	\$398	\$434
Mean DME Expenditures (SD)	\$201 (\$219)	\$379 (.)	\$659 (\$3,218)	\$269 (\$1,052)	\$281 (\$1,180)
Any Other Utilization (%)	76%	58%	65%	55%	55%
Total Other Expenditures (000s)	\$73	\$23	\$122	\$7,864	\$8,081
Mean Other Expenditures (SD)	\$805 (\$789)	\$758 (\$1,662)	\$640 (\$1,007)	\$635 (\$1,581)	\$637 (\$1,570)

Table B.6. Service Utilization and Spending in the 30 Days Prior to LTSS Entry, Age 65-79

	Facility First	Facility Only	HCBS First	HCBS Only	Total
Beneficiaries	464	95	929	11,604	13,092
Total Expenditures (000s)	\$7,798	\$277	\$2,126	\$44,455	\$54,655
Expenditures Per Beneficiary	\$16,806 (\$13,486)	\$2,912 (\$10,889)	\$2,288 (\$7,605)	\$3,831 (\$11,081)	\$4,175 (\$11,322)
Inpatient Utilization					
0 Inpatient Admissions (%)	19%	82%	90%	84%	82%
1 Inpatient Admission (%)	66%	14%	8%	13%	15%
2+ Inpatient Admissions (%)	15%	4%	2%	3%	4%
Mean Inpatient Bed Days (SD)	6.7 (4.9)	7.1 (4.3)	7.8 (5.7)	6.1 (4.4)	6.3 (4.5)
Total Inpatient Expenditures (000s)	\$6,688	\$221	\$1,266	\$31,268	\$39,443
Mean Inpatient Expenditures (SD)	\$17,787 (\$11,874)	\$15,785 (\$18,467)	\$13,910 (\$12,490)	\$16,956 (\$14,797)	\$16,965 (\$14,311)
ER Utilization					
0 ER Visits (%)	96%	97%	93%	93%	93%
1 ER Visit (%)	3%	3%	5%	5%	5%
2+ ER Visits	0%	0%	2%	2%	2%
Total ER Expenditures (000s)	\$22	\$3	\$59	\$843	\$926
Mean ER Expenditures (SD)	\$257 (\$320)	\$499 (\$666)	\$565 (\$697)	\$653 (\$1158)	\$623 (\$1103)
ER and Inpatient Stay (%)	59%	9%	18%	20%	21%
Any Outpatient Use (%)	63%	6%	36%	35%	36%
Total Outpatient Expenditures (000s)	\$97	<\$1	\$303	\$4,349	\$4,750
Mean Outpatient Expenditures (SD)	\$335 (\$615)	\$113 (\$86)	\$914 (\$3,084)	\$1,056 (\$2,974)	\$1,001 (\$2,897)
Any Primary Care Visits (%)	58%	15%	40%	43%	43%
Total Primary Care Expenditures (000s)	\$87	\$3	\$75	\$1,243	\$1,407
Mean Primary Care Expenditures (SD)	\$324 (\$390)	\$195 (\$211)	\$201 (\$281)	\$252 (\$718)	\$252 (\$684)
Any Specialty Provider Visits (%)	81%	12%	44%	44%	45%
Total Specialty Provider Expenditures (000s)	\$609	\$7	\$191	\$3,814	\$4,621
Mean Specialty Provider Expenditures (SD)	\$1,623 (\$1,100)	\$587 (\$633)	\$469 (\$801)	\$748 (\$1,256)	\$784 (\$1,240)
Any DME (%)	8%	6%	14%	12%	12%
Total DME Expenditures (000s)	\$4	<\$1	\$16	\$226	\$247
Mean DME Expenditures (SD)	\$99 (\$72)	\$162 (\$104)	\$125 (\$123)	\$165 (\$523)	\$160 (\$494)
Any Other Utilization (%)	89%	61%	59%	60%	61%
Total Other Expenditures (000s)	\$292	\$42	\$216	\$2,712	\$3,262
Mean Other Expenditures (SD)	\$711 (\$795)	\$720 (\$1,481)	\$392 (\$869)	\$392 (\$771)	\$411 (\$790)

Table B.7. Service Utilization and Spending in the 30 Days Prior to LTSS Entry, Age 80+

	Facility First	Facility Only	HCBS First	HCBS Only	Total
Beneficiaries	660	383	2,153	9,595	12,791
Total Expenditures (000s)	\$6,146	\$389	\$2,574	\$20,305	\$29,414
Expenditures Per Beneficiary	\$9,312 (\$12,508)	\$1,015 (\$2,603)	\$1,196 (\$5,274)	\$2,116 (\$6,550)	\$2,300 (\$7,137)
Inpatient Utilization					
0 Inpatient Admissions (%)	45%	98%	93%	88%	87%
1 Inpatient Admission (%)	45%	2%	6%	10%	11%
2+ Inpatient Admissions (%)	10%	0%	1%	2%	2%
Mean Inpatient Bed Days (SD)	6.8 (4.0)	9.2 (4.8)	6.5 (4.5)	6.0 (4.4)	6.3 (4.4)
Total Inpatient Expenditures (000s)	\$5,143	\$53	\$1,440	\$13,439	\$20,075
Mean Inpatient Expenditures (SD)	\$14,326 (\$11,399)	\$8,757 (\$4,838)	\$10,003 (\$11,996)	\$11,914 (\$9,775)	\$12,263 (\$10,413)
ER Utilization					
0 ER Visits (%)	94%	99%	95%	93%	93%
1 ER Visit (%)	4%	1%	4%	6%	5%
2+ ER Visits	2%	0%	1%	1%	1%
Total ER Expenditures (000s)	\$40	\$2	\$95	\$870	\$1,008
Mean ER Expenditures (SD)	\$230 (\$256)	\$1072 (\$359)	\$504 (\$612)	\$745 (\$1,025)	\$657 (\$940)
ER and Inpatient Stay (%)	42%	2%	8%	24%	21%
Any Outpatient Use (%)	36%	6%	25%	26%	25%
Total Outpatient Expenditures (000s)	\$82	\$6	\$279	\$1,853	\$2,220
Mean Outpatient Expenditures (SD)	\$351 (\$738)	\$251 (\$433)	\$522 (\$1,482)	\$754 (\$2,391)	\$683 (\$2,178)
Any Primary Care Visits (%)	49%	4%	35%	44%	42%
Total Primary Care Expenditures (000s)	\$126	\$2	\$140	\$902	\$1,170
Mean Primary Care Expenditures (SD)	\$387 (\$349)	\$116 (\$115)	\$186 (\$511)	\$213 (\$318)	\$219 (\$356)
Any Specialty Provider Visits (%)	57%	7%	36%	40%	40%
Total Specialty Provider Expenditures (000s)	\$395	\$13	\$276	\$1,775	\$2,460
Mean Specialty Provider Expenditures (SD)	\$1051 (\$897)	\$483 (\$1,567)	\$358 (\$670)	\$457 (\$789)	\$486 (\$804)
Any DME (%)	8%	2%	10%	9%	9%
Total DME Expenditures (000s)	\$7	\$872	\$32	\$104	\$144
Mean DME Expenditures (SD)	\$139 (\$167)	\$145 (\$85)	\$150 (\$244)	\$121 (\$206)	\$127 (\$212)
Any Other Utilization (%)	82%	72%	56%	56%	58%
Total Other Expenditures (000s)	\$352	\$312	\$312	\$1,361	\$2,338
Mean Other Expenditures (SD)	\$648 (\$2,126)	\$1,127 (\$2,015)	\$261 (\$722)	\$254 (\$641)	\$317 (\$950)

Appendix C. Logistic Regression Results Using Service Spending, Medicare and Commercial Insurance

The following SAS output is for the model that evaluates the risk of facility use (either first or only) relative to HCBS use (either first or only) among those who were enrolled in Medicare only (not dually eligible for Medicare and Medicaid) or enrolled in commercial insurance. This model includes spending levels for selected service categories.

Model Information	
Data Set	WORK.REGDATA_NOTCAID
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	35987
Number of Observations Used	35987

Response Profile		
Ordered Value	facind	Total Frequency
1	1	1311
2	0	34676

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	11260.677	9226.987
SC	11269.168	9464.732
-2 Log L	11258.677	9170.987

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	2087.6908	27	<.0001
Score	2427.4318	27	<.0001
Wald	1389.8477	27	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-3.7636	0.0834	2035.9201	<.0001
female	1	0.1357	0.0634	4.5773	0.0324
agele65	1	-1.0389	0.1577	43.3782	<.0001
agege80	1	0.4089	0.0677	36.4776	<.0001
comm_only_ind	1	-1.9997	0.2032	96.8610	<.0001
comorbid	1	-0.00191	0.0126	0.0232	0.8789
cancer	1	-0.1310	0.0800	2.6800	0.1016
diab	1	-0.0270	0.0768	0.1233	0.7254
anemia	1	0.1974	0.0867	5.1858	0.0228
delirium	1	1.4029	0.0839	279.7493	<.0001
mood	1	0.3720	0.1068	12.1200	0.0005
nervous	1	0.0314	0.1617	0.0378	0.8459
eye	1	-0.2073	0.0691	8.9848	0.0027
hypertension	1	0.0916	0.0649	1.9931	0.1580
cvas	1	0.0481	0.1128	0.1817	0.6699
arteries	1	0.3307	0.0721	21.0247	<.0001
respiratory	1	0.0832	0.0776	1.1491	0.2837
copd	1	-0.0325	0.1066	0.0932	0.7601

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
asthma	1	-0.1097	0.1699	0.4170	0.5184
joint	1	0.6823	0.0685	99.0877	<.0001
injury	1	0.0258	0.0813	0.1007	0.7509
ipspend	1	0.000048	2.999E-6	259.1385	<.0001
erspend	1	-0.00034	0.000120	8.1024	0.0044
opspend	1	-0.00031	0.000063	24.3196	<.0001
primarycarespend	1	0.000071	0.000048	2.1975	0.1382
specialtycarespend	1	0.000154	0.000029	28.1186	<.0001
dmespend	1	-0.00226	0.000699	10.4324	0.0012
otherspend	1	-6.11E-6	0.000040	0.0232	0.8790

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	1.145	1.011	1.297
agele65	0.354	0.260	0.482
agege80	1.505	1.318	1.719
comm_only_ind	0.135	0.091	0.202
comorbid	0.998	0.974	1.023
cancer	0.877	0.750	1.026
diab	0.973	0.837	1.132
anemia	1.218	1.028	1.444
delirium	4.067	3.450	4.794
mood	1.451	1.177	1.788
nervous	1.032	0.752	1.417
eye	0.813	0.710	0.931
hypertension	1.096	0.965	1.245
cvas	1.049	0.841	1.309
arteries	1.392	1.208	1.603
respiratory	1.087	0.933	1.265
copd	0.968	0.785	1.193

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
asthma	0.896	0.642	1.250
joint	1.978	1.730	2.263
injury	1.026	0.875	1.203
ipspend	1.000	1.000	1.000
erspend	1.000	0.999	1.000
opspend	1.000	1.000	1.000
primarycarespend	1.000	1.000	1.000
specialtycarespend	1.000	1.000	1.000
dmespend	0.998	0.996	0.999
otherspend	1.000	1.000	1.000

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	84.1	Somers' D	0.692
Percent Discordant	14.8	Gamma	0.700
Percent Tied	1.1	Tau-a	0.049
Pairs	45460236	c	0.846

Appendix D. Logistic Regression Results, Medicare and Commercial Insurance Stratified by Age

D.1. Age <65, Any Service Use

Model Information	
Data Set	WORK.REGDATA_NOTCAID65
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	13558
Number of Observations Used	13558

Response Profile		
Ordered Value	facind	Total Frequency
1	1	76
2	0	13482

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	941.541	718.720
SC	949.056	914.103
-2 Log L	939.541	666.720

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	272.8212	25	<.0001
Score	432.5968	25	<.0001
Wald	224.9079	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.4289	0.2730	263.1638	<.0001
female	1	-0.0822	0.2499	0.1081	0.7423
comm_only_ind	1	-2.9561	0.3095	91.2515	<.0001
comorbid	1	-0.0555	0.0518	1.1482	0.2839
cancer	1	0.00943	0.3813	0.0006	0.9803
diab	1	-0.4561	0.3558	1.6430	0.1999
anemia	1	0.7717	0.3867	3.9824	0.0460
delirium	1	1.5264	0.6747	5.1178	0.0237
mood	1	0.1243	0.3257	0.1457	0.7027
nervous	1	1.0250	0.4529	5.1217	0.0236
eye	1	0.3863	0.3832	1.0161	0.3134
hypertension	1	0.5175	0.2755	3.5298	0.0603
cvas	1	-0.3089	0.7654	0.1629	0.6865
arteries	1	0.7826	0.3760	4.3330	0.0374
respiratory	1	-0.1473	0.3531	0.1740	0.6765
copd	1	-0.3131	0.5730	0.2985	0.5848
asthma	1	0.2722	0.5662	0.2312	0.6307
joint	1	1.0615	0.2834	14.0253	0.0002
injury	1	0.0747	0.3191	0.0548	0.8150
ip	1	2.5972	0.3332	60.7549	<.0001
er	1	0.1310	0.6177	0.0450	0.8320
erip	1	1.8800	0.4840	15.0896	0.0001
op	1	-0.00135	0.2913	0.0000	0.9963
ps	1	-0.5325	0.2831	3.5383	0.0600

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
ss	1	-0.2526	0.3340	0.5721	0.4494
ds	1	-0.6437	0.4266	2.2768	0.1313

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	0.921	0.564	1.503
comm_only_ind	0.052	0.028	0.095
comorbid	0.946	0.855	1.047
cancer	1.009	0.478	2.131
diab	0.634	0.316	1.273
anemia	2.163	1.014	4.616
delirium	4.601	1.226	17.266
mood	1.132	0.598	2.144
nervous	2.787	1.147	6.772
eye	1.471	0.694	3.118
hypertension	1.678	0.978	2.879
cvas	0.734	0.164	3.291
arteries	2.187	1.047	4.570
respiratory	0.863	0.432	1.724
copd	0.731	0.238	2.248
asthma	1.313	0.433	3.982
joint	2.891	1.659	5.038
injury	1.078	0.576	2.014
ip	13.426	6.988	25.797
er	1.140	0.340	3.825
erip	6.553	2.538	16.921
op	0.999	0.564	1.767
ps	0.587	0.337	1.023
ss	0.777	0.404	1.495
ds	0.525	0.228	1.212

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	84.4	Somers' D	0.782
Percent Discordant	6.2	Gamma	0.864
Percent Tied	9.4	Tau-a	0.009
Pairs	1024632	c	0.891

D.2. Age <65, Spending by Service

Model Information	
Data Set	WORK.REGDATA_NOTCAID65
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	13558
Number of Observations Used	13558

Response Profile		
Ordered Value	facind	Total Frequency
1	1	76
2	0	13482

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	941.541	771.488
SC	949.056	966.871
-2 Log L	939.541	719.488

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	220.0527	25	<.0001
Score	327.3186	25	<.0001
Wald	177.2395	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.2274	0.2538	277.3581	<.0001
female	1	-0.0803	0.2444	0.1079	0.7425
comm_only_ind	1	-2.9036	0.3180	83.3761	<.0001
comorbid	1	-0.0337	0.0494	0.4638	0.4959
cancer	1	0.2083	0.3694	0.3180	0.5728
diab	1	-0.4689	0.3474	1.8223	0.1770
anemia	1	0.8976	0.3792	5.6025	0.0179
delirium	1	1.3933	0.6634	4.4114	0.0357
mood	1	0.0803	0.3126	0.0659	0.7974
nervous	1	0.9938	0.4319	5.2942	0.0214
eye	1	0.1818	0.3697	0.2417	0.6230
hypertension	1	0.5787	0.2659	4.7346	0.0296
cvas	1	-0.3907	0.7501	0.2713	0.6024
arteries	1	0.8605	0.3678	5.4749	0.0193
respiratory	1	-0.2820	0.3530	0.6383	0.4243
copd	1	-0.6113	0.5801	1.1105	0.2920
asthma	1	0.0924	0.5672	0.0265	0.8706
joint	1	1.3038	0.2654	24.1333	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
injury	1	0.00110	0.3145	0.0000	0.9972
ipspend	1	0.000030	0.000011	7.6910	0.0055
erspend	1	0.000136	0.000099	1.8976	0.1683
opspend	1	-0.00014	0.000135	1.0725	0.3004
primarycarespend	1	-0.00057	0.000611	0.8581	0.3543
specialtycarespend	1	0.000131	0.000038	11.8733	0.0006
dmespend	1	-0.00055	0.00142	0.1518	0.6968
otherspend	1	-0.00034	0.000229	2.1994	0.1381

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	0.923	0.572	1.490
comm_only_ind	0.055	0.029	0.102
comorbid	0.967	0.878	1.065
cancer	1.232	0.597	2.540
diab	0.626	0.317	1.236
anemia	2.454	1.167	5.160
delirium	4.028	1.098	14.782
mood	1.084	0.587	2.000
nervous	2.701	1.159	6.299
eye	1.199	0.581	2.475
hypertension	1.784	1.059	3.004
cvas	0.677	0.156	2.943
arteries	2.364	1.150	4.861
respiratory	0.754	0.378	1.506
copd	0.543	0.174	1.692
asthma	1.097	0.361	3.334
joint	3.683	2.189	6.196
injury	1.001	0.540	1.854
ipspend	1.000	1.000	1.000

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
erspend	1.000	1.000	1.000
opspend	1.000	1.000	1.000
primarycarespend	0.999	0.998	1.001
specialtycarespend	1.000	1.000	1.000
dmespend	0.999	0.997	1.002
otherspend	1.000	0.999	1.000

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	82.6	Somers' D	0.747
Percent Discordant	8.0	Gamma	0.824
Percent Tied	9.4	Tau-a	0.008
Pairs	1024632	c	0.873

D.3. Age 65-79, Any Service Use

Model Information	
Data Set	WORK.REGDATA_NOTCAID79
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	11137
Number of Observations Used	11137

Response Profile		
Ordered Value	facind	Total Frequency
1	1	472
2	0	10665

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	3909.738	3037.921
SC	3917.056	3228.189
-2 Log L	3907.738	2985.921

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	921.8171	25	<.0001
Score	1267.2907	25	<.0001
Wald	762.1602	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.1389	0.1388	889.6257	<.0001
female	1	-0.0624	0.1042	0.3589	0.5491
comm_only_ind	1	-0.6466	0.2129	9.2189	0.0024
comorbid	1	-0.0259	0.0212	1.4971	0.2211
cancer	1	-0.1427	0.1303	1.2002	0.2733
diab	1	0.00135	0.1241	0.0001	0.9913
anemia	1	-0.1329	0.1689	0.6189	0.4314
delirium	1	1.4320	0.2158	44.0194	<.0001
mood	1	0.4540	0.1787	6.4564	0.0111
nervous	1	0.4864	0.2709	3.2232	0.0726
eye	1	-0.0659	0.1211	0.2962	0.5863
hypertension	1	0.0286	0.1100	0.0675	0.7950
cvas	1	0.00721	0.2042	0.0012	0.9718

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
arteries	1	0.3662	0.1363	7.2136	0.0072
respiratory	1	0.00349	0.1312	0.0007	0.9788
copd	1	-0.1574	0.1809	0.7570	0.3843
asthma	1	0.1811	0.2664	0.4624	0.4965
joint	1	0.5208	0.1197	18.9380	<.0001
injury	1	0.2237	0.1355	2.7251	0.0988
ip	1	3.2778	0.1546	449.6995	<.0001
er	1	0.1281	0.3961	0.1047	0.7463
erip	1	2.5564	0.1920	177.3106	<.0001
op	1	-0.0635	0.1228	0.2678	0.6048
ps	1	-0.4363	0.1142	14.6032	0.0001
ss	1	-0.1571	0.1512	1.0799	0.2987
ds	1	-1.0289	0.1794	32.8960	<.0001

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	0.940	0.766	1.152
comm_only_ind	0.524	0.345	0.795
comorbid	0.974	0.935	1.016
cancer	0.867	0.672	1.119
diab	1.001	0.785	1.277
anemia	0.876	0.629	1.219
delirium	4.187	2.743	6.392
mood	1.575	1.109	2.235
nervous	1.626	0.956	2.766
eye	0.936	0.738	1.187
hypertension	1.029	0.829	1.276
cvas	1.007	0.675	1.503
arteries	1.442	1.104	1.884
respiratory	1.003	0.776	1.298

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
copd	0.854	0.599	1.218
asthma	1.199	0.711	2.020
joint	1.683	1.331	2.128
injury	1.251	0.959	1.631
ip	26.517	19.586	35.900
er	1.137	0.523	2.471
erip	12.890	8.848	18.779
op	0.938	0.738	1.194
ps	0.646	0.517	0.809
ss	0.855	0.636	1.149
ds	0.357	0.251	0.508

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	84.7	Somers' D	0.716
Percent Discordant	13.1	Gamma	0.732
Percent Tied	2.2	Tau-a	0.058
Pairs	5033880	c	0.858

D.4. Age 65-79, Spending by Service

Model Information	
Data Set	WORK.REGDATA_NOTCAID79
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	11137
Number of Observations Used	11137

Response Profile		
Ordered Value	facind	Total Frequency
1	1	472
2	0	10665

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	3909.738	3433.421
SC	3917.056	3623.690
-2 Log L	3907.738	3381.421

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	526.3163	25	<.0001
Score	768.6476	25	<.0001
Wald	482.6660	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-3.7497	0.1181	1008.2342	<.0001
female	1	-0.0307	0.1020	0.0905	0.7636
comm_only_ind	1	-0.7758	0.2228	12.1276	0.0005
comorbid	1	-0.00055	0.0209	0.0007	0.9791
cancer	1	0.0258	0.1262	0.0418	0.8381
diab	1	-0.0444	0.1211	0.1346	0.7137
anemia	1	-0.0313	0.1664	0.0355	0.8506

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
delirium	1	1.1162	0.2049	29.6784	<.0001
mood	1	0.3445	0.1726	3.9855	0.0459
nervous	1	0.2248	0.2564	0.7687	0.3806
eye	1	-0.1723	0.1179	2.1367	0.1438
hypertension	1	0.0467	0.1072	0.1897	0.6632
cvas	1	0.1322	0.2010	0.4328	0.5106
arteries	1	0.3475	0.1354	6.5847	0.0103
respiratory	1	-0.0432	0.1308	0.1092	0.7411
copd	1	-0.1446	0.1779	0.6602	0.4165
asthma	1	0.1025	0.2526	0.1647	0.6848
joint	1	0.9510	0.1106	73.9049	<.0001
injury	1	0.1185	0.1335	0.7879	0.3747
ipspend	1	0.000050	4.661E-6	112.8379	<.0001
erspend	1	-0.00042	0.000235	3.1145	0.0776
opspend	1	-0.00041	0.000100	16.6360	<.0001
primarycarespend	1	0.000022	0.000079	0.0757	0.7833
specialtycarespend	1	0.000241	0.000043	31.4136	<.0001
dmespend	1	-0.00491	0.00150	10.6899	0.0011
otherspend	1	-0.00020	0.000104	3.7224	0.0537

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	0.970	0.794	1.184
comm_only_ind	0.460	0.297	0.712
comorbid	0.999	0.959	1.041
cancer	1.026	0.801	1.314
diab	0.957	0.755	1.213
anemia	0.969	0.699	1.343
delirium	3.053	2.043	4.562
mood	1.411	1.006	1.979

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
nervous	1.252	0.757	2.070
eye	0.842	0.668	1.060
hypertension	1.048	0.849	1.293
cvas	1.141	0.770	1.692
arteries	1.416	1.086	1.846
respiratory	0.958	0.741	1.238
copd	0.865	0.611	1.226
asthma	1.108	0.675	1.818
joint	2.588	2.084	3.215
injury	1.126	0.867	1.462
ipspend	1.000	1.000	1.000
erspend	1.000	0.999	1.000
opspend	1.000	0.999	1.000
primarycarespend	1.000	1.000	1.000
specialtycarespend	1.000	1.000	1.000
dmespend	0.995	0.992	0.998
otherspend	1.000	1.000	1.000

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	80.3	Somers' D	0.633
Percent Discordant	17.1	Gamma	0.649
Percent Tied	2.6	Tau-a	0.051
Pairs	5033880	c	0.816

D.5. Age 80+, Any Service Use

Model Information	
Data Set	WORK.REGDATA_NOTCAID80
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	11292
Number of Observations Used	11292

Response Profile		
Ordered Value	facind	Total Frequency
1	1	763
2	0	10529

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	5587.189	4560.322
SC	5594.521	4750.950
-2 Log L	5585.189	4508.322

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	1076.8675	25	<.0001
Score	1319.4348	25	<.0001
Wald	917.4806	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-3.6554	0.1157	997.6912	<.0001
female	1	0.3491	0.0914	14.5855	0.0001
comm_only_ind	1	-0.7412	0.4938	2.2527	0.1334
comorbid	1	0.00639	0.0178	0.1286	0.7199
cancer	1	-0.3113	0.1138	7.4884	0.0062
diab	1	0.1464	0.1080	1.8387	0.1751
anemia	1	0.2514	0.1115	5.0865	0.0241
delirium	1	1.5979	0.1041	235.7301	<.0001
mood	1	0.5326	0.1604	11.0313	0.0009
nervous	1	-0.1658	0.2483	0.4460	0.5042
eye	1	-0.1199	0.0918	1.7039	0.1918
hypertension	1	0.0891	0.0895	0.9905	0.3196
cvas	1	-0.0181	0.1435	0.0159	0.8997
arteries	1	0.4140	0.0936	19.5468	<.0001
respiratory	1	0.0491	0.1059	0.2148	0.6431
copd	1	0.1236	0.1446	0.7312	0.3925
asthma	1	-0.0846	0.2611	0.1049	0.7460
joint	1	0.2821	0.1003	7.9060	0.0049
injury	1	0.0498	0.1122	0.1972	0.6570
ip	1	2.9751	0.1362	477.2039	<.0001
er	1	-0.3527	0.3164	1.2421	0.2651
erip	1	2.6477	0.1465	326.6221	<.0001
op	1	0.0719	0.1020	0.4965	0.4810
ps	1	-0.9261	0.1059	76.4567	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
ss	1	-0.3171	0.1086	8.5253	0.0035
ds	1	-0.8424	0.1695	24.7100	<.0001

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	1.418	1.185	1.696
comm_only_ind	0.477	0.181	1.254
comorbid	1.006	0.972	1.042
cancer	0.733	0.586	0.915
diab	1.158	0.937	1.430
anemia	1.286	1.033	1.600
delirium	4.943	4.031	6.061
mood	1.703	1.244	2.333
nervous	0.847	0.521	1.378
eye	0.887	0.741	1.062
hypertension	1.093	0.917	1.303
cvas	0.982	0.741	1.301
arteries	1.513	1.259	1.818
respiratory	1.050	0.853	1.292
copd	1.132	0.852	1.502
asthma	0.919	0.551	1.533
joint	1.326	1.089	1.614
injury	1.051	0.844	1.310
ip	19.592	15.002	25.587
er	0.703	0.378	1.307
erip	14.122	10.597	18.819
op	1.075	0.880	1.312
ps	0.396	0.322	0.487
ss	0.728	0.589	0.901
ds	0.431	0.309	0.600

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	82.4	Somers' D	0.657
Percent Discordant	16.7	Gamma	0.663
Percent Tied	0.9	Tau-a	0.083
Pairs	8033627	c	0.828

D.6. Age 80+, Spending by Service

Model Information	
Data Set	WORK.REGDATA_NOTCAID80
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	11292
Number of Observations Used	11292

Response Profile		
Ordered Value	facind	Total Frequency
1	1	763
2	0	10529

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	5587.189	4843.630
SC	5594.521	5034.258
-2 Log L	5585.189	4791.630

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	793.5595	25	<.0001
Score	1120.8753	25	<.0001
Wald	739.4264	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-3.5886	0.1101	1062.6132	<.0001
female	1	0.3290	0.0906	13.1862	0.0003
comm_only_ind	1	-0.6545	0.5012	1.7052	0.1916
comorbid	1	0.00222	0.0175	0.0161	0.8989
cancer	1	-0.3385	0.1138	8.8453	0.0029
diab	1	0.00313	0.1079	0.0008	0.9769
anemia	1	0.1973	0.1097	3.2377	0.0720
delirium	1	1.5739	0.0980	257.9791	<.0001
mood	1	0.5058	0.1549	10.6660	0.0011
nervous	1	-0.2660	0.2412	1.2157	0.2702
eye	1	-0.2485	0.0904	7.5506	0.0060
hypertension	1	0.0195	0.0877	0.0496	0.8238
cvas	1	0.0607	0.1419	0.1833	0.6686
arteries	1	0.3599	0.0918	15.3745	<.0001
respiratory	1	0.1004	0.1049	0.9151	0.3388
copd	1	0.1101	0.1414	0.6072	0.4359
asthma	1	-0.3223	0.2617	1.5163	0.2182
joint	1	0.3420	0.0972	12.3774	0.0004

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
injury	1	0.00138	0.1111	0.0002	0.9901
ipspend	1	0.000069	5.95E-6	134.9467	<.0001
erspend	1	-0.00060	0.000192	9.9046	0.0016
opspend	1	-0.00035	0.000109	10.4879	0.0012
primarycarespend	1	0.000387	0.000134	8.3840	0.0038
specialtycarespend	1	0.000289	0.000062	21.3676	<.0001
dmespend	1	-0.00138	0.000889	2.4019	0.1212
otherspend	1	0.000126	0.000049	6.7495	0.0094

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	1.390	1.163	1.659
comm_only_ind	0.520	0.195	1.388
comorbid	1.002	0.968	1.037
cancer	0.713	0.570	0.891
diab	1.003	0.812	1.239
anemia	1.218	0.983	1.510
delirium	4.826	3.982	5.847
mood	1.658	1.224	2.247
nervous	0.766	0.478	1.230
eye	0.780	0.653	0.931
hypertension	1.020	0.859	1.211
cvas	1.063	0.805	1.403
arteries	1.433	1.197	1.716
respiratory	1.106	0.900	1.358
copd	1.116	0.846	1.473
asthma	0.724	0.434	1.210
joint	1.408	1.164	1.703
injury	1.001	0.805	1.245
ipspend	1.000	1.000	1.000

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
erspend	0.999	0.999	1.000
opspend	1.000	0.999	1.000
primarycarespend	1.000	1.000	1.001
specialtycarespend	1.000	1.000	1.000
dmespend	0.999	0.997	1.000
otherspend	1.000	1.000	1.000

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	78.5	Somers' D	0.585
Percent Discordant	20.1	Gamma	0.593
Percent Tied	1.4	Tau-a	0.074
Pairs	8033627	c	0.792

Appendix E. Logistic Regression Results Using Service Spending, Medicaid Only and Dual Eligibles

The following SAS output is for the model that evaluates the risk of facility use (either first or only) relative to HCBS use (either first or only) among those who were enrolled in Medicaid only or were dually eligible for Medicare and Medicaid. This model includes spending levels for selected service categories.

Model Information	
Data Set	WORK.REGDATA_CAID
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	12728
Number of Observations Used	12728

Response Profile		
Ordered Value	facind	Total Frequency
1	1	423
2	0	12305

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	3713.726	2554.821
SC	3721.178	2763.465
-2 Log L	3711.726	2498.821

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	1212.9048	27	<.0001
Score	2668.9159	27	<.0001
Wald	1007.6437	27	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-3.5055	0.2123	272.6885	<.0001
female	1	-0.2055	0.1265	2.6396	0.1042
agele65	1	-1.1799	0.1961	36.2136	<.0001
agege80	1	1.2096	0.1557	60.3545	<.0001
dual	1	-0.0900	0.1625	0.3069	0.5796
comorbid	1	0.0316	0.0247	1.6364	0.2008
cancer	1	-0.3735	0.2019	3.4203	0.0644
diab	1	0.1185	0.1461	0.6577	0.4174
anemia	1	0.0459	0.1892	0.0589	0.8082
delirium	1	2.2090	0.1543	204.9448	<.0001
mood	1	-0.2461	0.1721	2.0444	0.1528
nervous	1	0.3044	0.3602	0.7142	0.3981
eye	1	-0.1762	0.1415	1.5519	0.2129
hypertension	1	-0.2392	0.1315	3.3109	0.0688
cvas	1	0.1770	0.2328	0.5782	0.4470
arteries	1	0.6363	0.1519	17.5415	<.0001
respiratory	1	-0.00245	0.1541	0.0003	0.9873
copd	1	0.0151	0.2053	0.0054	0.9416
asthma	1	-0.9985	0.3988	6.2682	0.0123
joint	1	0.1109	0.1531	0.5240	0.4691
injury	1	-0.2298	0.1766	1.6939	0.1931
ipspend	1	0.000046	7.189E-6	41.4852	<.0001
erspend	1	-0.00078	0.000361	4.6565	0.0309
opspend	1	-0.00039	0.000172	5.1534	0.0232

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
primarycarespend	1	0.000089	0.000148	0.3629	0.5469
specialtycarespend	1	0.000451	0.000081	31.0616	<.0001
dmespend	1	-0.00139	0.00116	1.4307	0.2317
otherspend	1	0.000095	0.000029	10.9427	0.0009

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	0.814	0.635	1.043
agele65	0.307	0.209	0.451
agege80	3.352	2.471	4.548
dual	0.914	0.665	1.257
comorbid	1.032	0.983	1.083
cancer	0.688	0.463	1.023
diab	1.126	0.845	1.499
anemia	1.047	0.723	1.517
delirium	9.107	6.730	12.322
mood	0.782	0.558	1.096
nervous	1.356	0.669	2.747
eye	0.838	0.635	1.106
hypertension	0.787	0.608	1.019
cvas	1.194	0.756	1.884
arteries	1.889	1.403	2.545
respiratory	0.998	0.738	1.349
copd	1.015	0.679	1.518
asthma	0.368	0.169	0.805
joint	1.117	0.828	1.508
injury	0.795	0.562	1.123
ipspend	1.000	1.000	1.000
erspend	0.999	0.999	1.000
opspend	1.000	0.999	1.000

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
primarycarespend	1.000	1.000	1.000
specialtycarespend	1.000	1.000	1.001
dmespend	0.999	0.996	1.001
otherspend	1.000	1.000	1.000

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	88.8	Somers' D	0.799
Percent Discordant	9.0	Gamma	0.817
Percent Tied	2.2	Tau-a	0.051
Pairs	5205015	c	0.899

Appendix F. Logistic Regression Results, Medicaid Only and Dual Eligibles Stratified by Age

F.1. Age <65, Any Service Use

Model Information	
Data Set	WORK.REGDATA_CAID65
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	9349
Number of Observations Used	9349

Response Profile		
Ordered Value	facind	Total Frequency
1	1	93
2	0	9256

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	1044.611	909.969
SC	1051.754	1095.688
-2 Log L	1042.611	857.969

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	184.6419	25	<.0001
Score	323.0830	25	<.0001
Wald	197.0314	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.3106	0.2020	455.3714	<.0001
female	1	-1.0981	0.2316	22.4708	<.0001
dual	1	0.2502	0.2393	1.0933	0.2957
comorbid	1	0.0239	0.0462	0.2664	0.6058
cancer	1	-0.0328	0.3883	0.0072	0.9326
diab	1	0.4614	0.3007	2.3543	0.1249
anemia	1	-0.3733	0.6191	0.3636	0.5465
delirium	1	2.4928	0.4777	27.2300	<.0001
mood	1	-0.7999	0.3131	6.5280	0.0106
nervous	1	0.7078	0.6365	1.2368	0.2661
eye	1	-0.2358	0.3774	0.3904	0.5321
hypertension	1	-0.7090	0.3166	5.0169	0.0251
cvas	1	0.1446	0.5888	0.0603	0.8060
arteries	1	-0.4586	0.6273	0.5343	0.4648
respiratory	1	0.0745	0.3075	0.0587	0.8086
copd	1	-0.1952	0.4652	0.1761	0.6748
asthma	1	-1.0824	0.7657	1.9983	0.1575
joint	1	0.3029	0.3034	0.9967	0.3181
injury	1	-0.5455	0.3300	2.7335	0.0983
ip	1	2.4093	0.3075	61.4072	<.0001
er	1	-1.4867	0.7248	4.2078	0.0402
erip	1	0.8772	0.4408	3.9611	0.0466
op	1	-0.8371	0.2899	8.3399	0.0039
ps	1	0.1785	0.2671	0.4463	0.5041

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
ss	1	0.9082	0.2972	9.3381	0.0022
ds	1	-0.4598	0.4105	1.2546	0.2627

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	0.334	0.212	0.525
dual	1.284	0.803	2.053
comorbid	1.024	0.935	1.121
cancer	0.968	0.452	2.071
diab	1.586	0.880	2.860
anemia	0.688	0.205	2.317
delirium	12.095	4.742	30.848
mood	0.449	0.243	0.830
nervous	2.030	0.583	7.066
eye	0.790	0.377	1.655
hypertension	0.492	0.265	0.915
cvas	1.156	0.364	3.664
arteries	0.632	0.185	2.162
respiratory	1.077	0.590	1.969
copd	0.823	0.331	2.047
asthma	0.339	0.076	1.519
joint	1.354	0.747	2.454
injury	0.580	0.304	1.106
ip	11.126	6.090	20.327
er	0.226	0.055	0.936
erip	2.404	1.013	5.704
op	0.433	0.245	0.764
ps	1.195	0.708	2.018
ss	2.480	1.385	4.440
ds	0.631	0.282	1.412

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	82.7	Somers' D	0.702
Percent Discordant	12.5	Gamma	0.738
Percent Tied	4.8	Tau-a	0.014
Pairs	860808	c	0.851

F.2. Age <65, Spending by Service

Model Information	
Data Set	WORK.REGDATA_CAID65
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	9349
Number of Observations Used	9349

Response Profile		
Ordered Value	facind	Total Frequency
1	1	93
2	0	9256

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	1044.611	940.711
SC	1051.754	1126.429
-2 Log L	1042.611	888.711

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	153.9001	25	<.0001
Score	364.4814	25	<.0001
Wald	165.0957	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.2197	0.1956	465.3945	<.0001
female	1	-1.0926	0.2333	21.9360	<.0001
dual	1	0.2977	0.2395	1.5452	0.2138
comorbid	1	0.0129	0.0472	0.0744	0.7850
cancer	1	0.1470	0.3962	0.1376	0.7107
diab	1	0.5039	0.2961	2.8957	0.0888
anemia	1	-0.4020	0.6210	0.4191	0.5174
delirium	1	2.6017	0.4596	32.0393	<.0001
mood	1	-0.8153	0.3150	6.7002	0.0096
nervous	1	0.7602	0.6496	1.3694	0.2419
eye	1	-0.1845	0.3779	0.2383	0.6254
hypertension	1	-0.6411	0.3162	4.1116	0.0426
cvas	1	0.5557	0.5817	0.9128	0.3394
arteries	1	-0.5813	0.6439	0.8152	0.3666
respiratory	1	0.1357	0.3115	0.1897	0.6632
copd	1	-0.0805	0.4567	0.0311	0.8601
asthma	1	-1.2036	0.7882	2.3320	0.1267
joint	1	0.4034	0.3098	1.6950	0.1929

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
injury	1	-0.4910	0.3341	2.1595	0.1417
ipspend	1	0.000037	8.653E-6	17.8391	<.0001
erspend	1	-0.00095	0.000616	2.3979	0.1215
opspend	1	-0.00039	0.000272	2.0730	0.1499
primarycarespend	1	0.000462	0.000252	3.3769	0.0661
specialtycarespend	1	0.000503	0.000099	25.6486	<.0001
dmespend	1	-0.00009	0.000873	0.0099	0.9209
otherspend	1	0.000025	0.000079	0.1021	0.7493

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	0.335	0.212	0.530
dual	1.347	0.842	2.153
comorbid	1.013	0.924	1.111
cancer	1.158	0.533	2.518
diab	1.655	0.926	2.957
anemia	0.669	0.198	2.259
delirium	13.486	5.478	33.200
mood	0.442	0.239	0.820
nervous	2.139	0.599	7.640
eye	0.832	0.397	1.744
hypertension	0.527	0.283	0.979
cvas	1.743	0.557	5.451
arteries	0.559	0.158	1.975
respiratory	1.145	0.622	2.109
copd	0.923	0.377	2.258
asthma	0.300	0.064	1.407
joint	1.497	0.816	2.747
injury	0.612	0.318	1.178
ipspend	1.000	1.000	1.000

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
erspend	0.999	0.998	1.000
opspend	1.000	0.999	1.000
primarycarespend	1.000	1.000	1.001
specialtycarespend	1.001	1.000	1.001
dmespend	1.000	0.998	1.002
otherspend	1.000	1.000	1.000

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	79.2	Somers' D	0.643
Percent Discordant	14.9	Gamma	0.684
Percent Tied	6.0	Tau-a	0.013
Pairs	860808	c	0.822

F.3. Age 65-79, Any Service Use

Model Information	
Data Set	WORK.REGDATA_CAID79
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	1922
Number of Observations Used	1922

Response Profile		
Ordered Value	facind	Total Frequency
1	1	78
2	0	1844

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	654.679	492.562
SC	660.240	637.151
-2 Log L	652.679	440.562

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	212.1172	25	<.0001
Score	324.6439	25	<.0001
Wald	153.6661	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.9414	0.5118	93.2101	<.0001
female	1	0.0689	0.2836	0.0590	0.8081
dual	1	0.6361	0.4206	2.2866	0.1305
comorbid	1	0.0144	0.0530	0.0733	0.7866
cancer	1	-0.6512	0.3909	2.7745	0.0958
diab	1	0.0509	0.3046	0.0280	0.8672
anemia	1	-0.2536	0.4328	0.3433	0.5580
delirium	1	3.2735	0.3922	69.6745	<.0001
mood	1	-0.1028	0.3827	0.0721	0.7883
nervous	1	-0.6267	0.8564	0.5355	0.4643
eye	1	0.1880	0.2852	0.4343	0.5099
hypertension	1	-0.00067	0.2957	0.0000	0.9982
cvas	1	0.6782	0.4147	2.6742	0.1020

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
arteries	1	0.3584	0.3410	1.1043	0.2933
respiratory	1	0.1241	0.3376	0.1352	0.7131
copd	1	-0.1350	0.4114	0.1077	0.7428
asthma	1	-1.0434	0.6655	2.4583	0.1169
joint	1	0.5359	0.3253	2.7136	0.0995
injury	1	0.1606	0.3702	0.1883	0.6644
ip	1	3.9448	0.4674	71.2355	<.0001
er	1	-0.9719	1.0842	0.8036	0.3700
erip	1	3.6710	0.4762	59.4173	<.0001
op	1	-0.4864	0.3121	2.4287	0.1191
ps	1	-0.8730	0.3469	6.3330	0.0119
ss	1	-0.1122	0.3736	0.0901	0.7640
ds	1	-1.3586	0.5401	6.3266	0.0119

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	1.071	0.614	1.868
dual	1.889	0.828	4.308
comorbid	1.014	0.914	1.126
cancer	0.521	0.242	1.122
diab	1.052	0.579	1.911
anemia	0.776	0.332	1.812
delirium	26.403	12.242	56.947
mood	0.902	0.426	1.910
nervous	0.534	0.100	2.863
eye	1.207	0.690	2.111
hypertension	0.999	0.560	1.784
cvas	1.970	0.874	4.442
arteries	1.431	0.733	2.792
respiratory	1.132	0.584	2.194

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
copd	0.874	0.390	1.957
asthma	0.352	0.096	1.298
joint	1.709	0.903	3.233
injury	1.174	0.568	2.426
ip	51.665	20.671	129.133
er	0.378	0.045	3.168
erip	39.290	15.449	99.922
op	0.615	0.334	1.134
ps	0.418	0.212	0.824
ss	0.894	0.430	1.859
ds	0.257	0.089	0.741

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	89.1	Somers' D	0.795
Percent Discordant	9.6	Gamma	0.806
Percent Tied	1.3	Tau-a	0.062
Pairs	143832	c	0.898

F.4. Age 65-79, Spending by Service

Model Information	
Data Set	WORK.REGDATA_CAID79
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	1922
Number of Observations Used	1922

Response Profile		
Ordered Value	facind	Total Frequency
1	1	78
2	0	1844

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	654.679	545.401
SC	660.240	689.990
-2 Log L	652.679	493.401

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	159.2780	25	<.0001
Score	315.1975	25	<.0001
Wald	150.4786	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.3545	0.4710	85.4862	<.0001
female	1	0.1737	0.2796	0.3860	0.5344
dual	1	0.2296	0.4145	0.3068	0.5796
comorbid	1	-0.00156	0.0534	0.0009	0.9766
cancer	1	-0.6243	0.4139	2.2754	0.1314
diab	1	-0.1529	0.3053	0.2508	0.6165
anemia	1	-0.3456	0.4626	0.5583	0.4550
delirium	1	2.7034	0.3666	54.3805	<.0001
mood	1	0.0245	0.3660	0.0045	0.9466
nervous	1	-0.7558	0.8494	0.7917	0.3736
eye	1	0.3130	0.2825	1.2279	0.2678
hypertension	1	-0.1465	0.2857	0.2631	0.6080
cvas	1	0.8145	0.3934	4.2872	0.0384
arteries	1	0.3798	0.3463	1.2026	0.2728
respiratory	1	0.0470	0.3433	0.0187	0.8911
copd	1	0.0604	0.3989	0.0229	0.8797
asthma	1	-0.6874	0.6495	1.1200	0.2899
joint	1	0.3708	0.3158	1.3790	0.2403
injury	1	0.0815	0.3746	0.0473	0.8278
ipspend	1	0.000092	0.000020	21.3907	<.0001
erspend	1	-0.00034	0.000622	0.2918	0.5891
opspend	1	-0.00004	0.000189	0.0541	0.8160
primarycarespend	1	-0.00008	0.000496	0.0260	0.8719
specialtycarespend	1	0.000333	0.000222	2.2500	0.1336

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
dmespend	1	-0.00239	0.00293	0.6660	0.4144
otherspend	1	0.000199	0.000108	3.3803	0.0660

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	1.190	0.688	2.058
dual	1.258	0.558	2.835
comorbid	0.998	0.899	1.109
cancer	0.536	0.238	1.205
diab	0.858	0.472	1.561
anemia	0.708	0.286	1.752
delirium	14.930	7.278	30.628
mood	1.025	0.500	2.100
nervous	0.470	0.089	2.482
eye	1.368	0.786	2.379
hypertension	0.864	0.493	1.512
cvas	2.258	1.044	4.882
arteries	1.462	0.742	2.882
respiratory	1.048	0.535	2.054
copd	1.062	0.486	2.321
asthma	0.503	0.141	1.796
joint	1.449	0.780	2.690
injury	1.085	0.521	2.261
ipspend	1.000	1.000	1.000
erspend	1.000	0.998	1.001
opspend	1.000	1.000	1.000
primarycarespend	1.000	0.999	1.001
specialtycarespend	1.000	1.000	1.001
dmespend	0.998	0.992	1.003
otherspend	1.000	1.000	1.000

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	86.2	Somers' D	0.738
Percent Discordant	12.4	Gamma	0.749
Percent Tied	1.4	Tau-a	0.058
Pairs	143832	c	0.869

F.5. Age 80+, Any Service Use

Model Information	
Data Set	WORK.REGDATA_CAID80
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	1457
Number of Observations Used	1457

Response Profile		
Ordered Value	facind	Total Frequency
1	1	252
2	0	1205

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	1344.031	1002.240
SC	1349.315	1139.628
-2 Log L	1342.031	950.240

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	391.7902	25	<.0001
Score	400.5892	25	<.0001
Wald	260.7971	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-2.1394	0.2809	58.0193	<.0001
female	1	0.4117	0.2216	3.4522	0.0632
dual	1	-0.6645	0.2554	6.7697	0.0093
comorbid	1	0.1130	0.0415	7.4040	0.0065
cancer	1	-0.3823	0.3146	1.4766	0.2243
diab	1	0.1120	0.2269	0.2436	0.6216
anemia	1	0.2283	0.2530	0.8146	0.3668
delirium	1	1.7469	0.1976	78.1580	<.0001
mood	1	0.3176	0.2969	1.1442	0.2848
nervous	1	1.0294	0.5352	3.6992	0.0544
eye	1	-0.3881	0.2005	3.7466	0.0529
hypertension	1	-0.2237	0.1897	1.3906	0.2383
cvas	1	-0.4904	0.3437	2.0360	0.1536
arteries	1	0.7877	0.2126	13.7265	0.0002
respiratory	1	-0.3218	0.2301	1.9553	0.1620
copd	1	0.1247	0.3219	0.1502	0.6984
asthma	1	-1.4212	0.8069	3.1020	0.0782
joint	1	-0.1666	0.2377	0.4913	0.4834

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
injury	1	-0.2857	0.2786	1.0516	0.3051
ip	1	2.9082	0.5037	33.3330	<.0001
er	1	-0.3579	0.6537	0.2997	0.5840
erip	1	3.1960	0.5305	36.2875	<.0001
op	1	-0.4088	0.2789	2.1487	0.1427
ps	1	-1.8426	0.3487	27.9278	<.0001
ss	1	-0.7584	0.2874	6.9648	0.0083
ds	1	-0.6874	0.4003	2.9479	0.0860

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	1.509	0.978	2.330
dual	0.515	0.312	0.849
comorbid	1.120	1.032	1.215
cancer	0.682	0.368	1.264
diab	1.119	0.717	1.745
anemia	1.257	0.765	2.063
delirium	5.737	3.895	8.450
mood	1.374	0.768	2.459
nervous	2.799	0.981	7.992
eye	0.678	0.458	1.005
hypertension	0.800	0.551	1.160
cvas	0.612	0.312	1.201
arteries	2.198	1.449	3.335
respiratory	0.725	0.462	1.138
copd	1.133	0.603	2.129
asthma	0.241	0.050	1.174
joint	0.847	0.531	1.349
injury	0.751	0.435	1.297
ip	18.324	6.827	49.180

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
er	0.699	0.194	2.518
erip	24.434	8.638	69.120
op	0.664	0.385	1.148
ps	0.158	0.080	0.314
ss	0.468	0.267	0.823
ds	0.503	0.229	1.102

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	86.1	Somers' D	0.727
Percent Discordant	13.4	Gamma	0.730
Percent Tied	0.5	Tau-a	0.208
Pairs	303660	c	0.863

F.6. Age 80+, Spending by Service

Model Information	
Data Set	WORK.REGDATA_CAID80
Response Variable	facind
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	1457
Number of Observations Used	1457

Response Profile		
Ordered Value	facind	Total Frequency
1	1	252
2	0	1205

Probability modeled is facind=1.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	1344.031	1047.463
SC	1349.315	1184.850
-2 Log L	1342.031	995.463

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	346.5678	25	<.0001
Score	384.3767	25	<.0001
Wald	261.8930	25	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-2.2018	0.2808	61.4789	<.0001
female	1	0.3644	0.2193	2.7603	0.0966
dual	1	-0.8365	0.2533	10.9048	0.0010
comorbid	1	0.0818	0.0387	4.4563	0.0348
cancer	1	-0.3659	0.3012	1.4760	0.2244
diab	1	0.1892	0.2166	0.7633	0.3823
anemia	1	0.1694	0.2415	0.4916	0.4832

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
delirium	1	1.7970	0.1946	85.2368	<.0001
mood	1	0.2837	0.2868	0.9780	0.3227
nervous	1	0.5855	0.5416	1.1689	0.2796
eye	1	-0.3460	0.1952	3.1402	0.0764
hypertension	1	-0.2693	0.1835	2.1537	0.1422
cvas	1	-0.4247	0.3428	1.5344	0.2155
arteries	1	0.8277	0.2063	16.0919	<.0001
respiratory	1	-0.1420	0.2231	0.4052	0.5244
copd	1	0.0953	0.3136	0.0923	0.7613
asthma	1	-1.6617	0.8888	3.4955	0.0615
joint	1	-0.3267	0.2317	1.9880	0.1585
injury	1	-0.2059	0.2713	0.5757	0.4480
ipspend	1	0.000168	0.000043	15.6038	<.0001
erspend	1	-0.00081	0.000675	1.4445	0.2294
opspend	1	-0.00054	0.000448	1.4728	0.2249
primarycarespend	1	-0.00152	0.000739	4.2245	0.0398
specialtycarespend	1	-0.00035	0.000446	0.6219	0.4303
dmespend	1	-0.00595	0.00377	2.4911	0.1145
otherspend	1	0.000157	0.000051	9.4145	0.0022

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
female	1.440	0.937	2.213
dual	0.433	0.264	0.712
comorbid	1.085	1.006	1.171
cancer	0.694	0.384	1.252
diab	1.208	0.790	1.847
anemia	1.185	0.738	1.902
delirium	6.032	4.119	8.833
mood	1.328	0.757	2.330

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
nervous	1.796	0.621	5.191
eye	0.708	0.483	1.037
hypertension	0.764	0.533	1.095
cvas	0.654	0.334	1.281
arteries	2.288	1.527	3.428
respiratory	0.868	0.560	1.343
copd	1.100	0.595	2.034
asthma	0.190	0.033	1.084
joint	0.721	0.458	1.136
injury	0.814	0.478	1.385
ipspend	1.000	1.000	1.000
erspend	0.999	0.998	1.001
opspend	0.999	0.999	1.000
primarycarespend	0.998	0.997	1.000
specialtycarespend	1.000	0.999	1.001
dmespend	0.994	0.987	1.001
otherspend	1.000	1.000	1.000

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	84.7	Somers' D	0.698
Percent Discordant	14.8	Gamma	0.702
Percent Tied	0.5	Tau-a	0.200
Pairs	303660	c	0.849