

The Hilltop Institute



analysis to advance the health of vulnerable populations

An Analysis of Medicaid Costs for Persons with Traumatic Brain Injury While Residing in Maryland Nursing Facilities

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Table of Contents

Executive Summary i

Introduction..... 1

Background..... 2

Study Purpose 3

Methodology..... 4

 Defining the Study Population..... 4

 Identifying the Study Population 4

 Defining a Nursing Facility Experience 6

 Identifying Services to Be Studied 6

 Identifying Psychotropic Medications to Be Studied 7

 The Analysis 8

Findings..... 9

 Number of Users and Costs 9

 Service Utilization 11

 Age, Gender, and Area of Residence..... 17

 Dual Eligibles..... 23

 Long-Stay Nursing Facility Residents 25

 Psychotropic Medications..... 26

Conclusion 33

List of Tables and Figures

Table 1. Number of Days in Nursing Facilities and Related Medicaid Costs for the Study Population, FYs 2004-2006 9

Table 2. Medicaid Costs by Diagnosis Group for the Study Population While Residing in Maryland Nursing Facilities, FYs 2004-2006 10

Table 3. Average Number of Nursing Facility Days and Average Medicaid Costs per User by Diagnosis Group, FYs 2004-2006 10

Table 4. TBI-Only Diagnosis Group: Medicaid Costs for All Services Received While in Maryland Nursing Facilities, FYs 2004-2006 12

Table 5. Anoxia-Only Diagnosis Group: Medicaid Costs for All Services Received While in Maryland Nursing Facilities, FYs 2004-2006..... 13



Table 6. TBI and Anoxia Diagnosis Group: Medicaid Costs for All Services Received While in Maryland Nursing Facilities, FYs 2004-2006.....	14
Table 7. All Diagnosis Groups: Medicaid Costs for All Services Received While in Maryland Nursing Facilities, FYs 2004-2006	15
Table 8. All Diagnosis Groups: Highest Cost per User and Average Cost per User in Each Service Category, FYs 2004-2006.....	16
Table 9. Number of Users Under and Over Age 65 by Diagnosis Group, FYs 2004-2006	17
Table 10. Percentage Change in the Number of Users and Costs by Age and Diagnosis Group, FY 2004 to FY 2006	18
Table 11. TBI-Only: Nursing Facility Days and Medicaid Costs by Age, Gender, and Region FYs 2004-2006	19
Table 12. Anoxia-Only: Nursing Facility Days and Medicaid Costs by Age, Gender, and Region, FYs 2004-2006	20
Table 13. TBI and Anoxia: Nursing Facility Days and Medicaid Costs by Age, Gender, and Region, FYs 2004-2006	21
Table 14. All Diagnosis Groups: Nursing Facility Days and Medicaid Costs by Age, Gender, and Region, FYs 2004-2006	22
Table 15. Medicaid Costs for Dual Eligibles and Medicaid-Only Individuals, FYs 2004-2006.....	23
Table 16. Average and Highest Medicaid Costs Per User for Dual Eligibles and Medicaid-Only Individuals, FYs 2004-2006	23
Table 17. Medicaid Costs for Dual Eligibles and Medicaid-Only Individuals by Number of Days in a Nursing Facility, FY 2006.....	24
Figure 1. Medicaid Costs for Individuals Residing in a Nursing Facility for 300 Days or More: Dual Eligibles versus Medicaid-Only Individuals, FY 2006.....	24
Table 18. Average Per Capita Medicaid Costs by Service Category for Individuals Residing in a Nursing Facility for 300 Days or More, FY 2006	25
Figure 2. Average Per Capita Medicaid Costs by Service Category for Individuals Residing in a Nursing Facility for 300 Days or More, FY 2006*	26
Table 19. TBI-Only: Medicaid Costs by Psychotropic Medication Class, FYs 2004-2006.....	27
Table 20. Anoxia-Only: Medicaid Costs by Psychotropic Medication Class, FYs 2004-2006 ...	28
Table 21. TBI and Anoxia: Medicaid Costs by Psychotropic Medication Class, FYs 2004-2006.....	29
Table 22. TBI-Only: Most Frequently Occurring Drug Combinations, FYs 2004-2006	30
Table 23. Anoxia-Only: Most Frequently Occurring Drug Combinations, FYs 2004-2006.....	31
Table 24. TBI and Anoxia: Most Frequently Occurring Drug Combinations, FYs 2004-2006...	32



An Analysis of Medicaid Costs for Persons with Traumatic Brain Injury While Residing in Maryland Nursing Facilities

Executive Summary

The Maryland Department of Health and Mental Hygiene (DHMH), on behalf of Maryland’s Money Follows the Person (MFP) demonstration, requested that The Hilltop Institute conduct a study to provide a better understanding of service utilization by Medicaid beneficiaries with traumatic brain injury who reside in nursing facilities. While much is known about the health care utilization patterns of older adults and individuals with physical disabilities who participate in the Maryland Medicaid program, little is known about those individuals in the Medicaid program with traumatic brain injury. Maryland, like many other states, is working to rebalance its long-term care system from one that is dependent on institutional care to one that offers a wide array of community-based supports and services. Findings from this study will help MFP better plan for the needs of persons with traumatic brain injury who seek to transition from institutions to the community.

This study addressed the following questions:

- How many Medicaid-eligible individuals with traumatic brain injury are cared for in nursing facilities in Maryland? Is the number increasing or decreasing?
- How many of these individuals have a diagnosis of traumatic brain injury, anoxia,¹ or both?
- How many of these individuals are eligible for both Medicare and Medicaid (“dual eligibles”)?
- What are the demographic characteristics of these individuals—i.e., age, gender, and region of residence?
- What is the cost of caring for these individuals in nursing facilities?
- What kinds of health services do these individuals use while residing in a nursing facility and what is the cost of those services?
- What kinds of psychotropic medications do these individuals use while residing in a nursing facility, and what is the cost of those medications?

The study population was defined as Maryland Medicaid beneficiaries who a) received a diagnosis of traumatic brain injury (TBI), anoxia, or both TBI and anoxia at some point during fiscal years (FYs) 1994-2006 and b) resided in a Maryland nursing facility at some point during FYs 2004-2006. Data from the federal Minimum Data Set (MDS) and Medicaid Management Information Systems (MMIS) files were searched to both identify and compile a finder file of individuals meeting the study population criteria. The study population was divided into three

¹ Anoxia, or anoxic brain damage, is caused by an inadequate flow of oxygen to the brain.



diagnosis groups: TBI-Only, Anoxia-Only, and both TBI and Anoxia. Hilltop examined Medicaid costs during nursing facility stays by the study population for those who had a nursing facility stay during FYs 2004-2006 in order to analyze service utilization and costs. At DHMH's request, Hilltop focused on the following services believed to be most relevant to understanding the potential service needs of persons with brain injury who may seek a transition to the community: durable medical equipment, emergency department visits, inpatient hospitalizations, mental health, nursing facility costs, occupational/ physical/speech therapies, and psychotropic medications.

The study found that the number of Medicaid beneficiaries with a diagnosis of TBI and/or anoxia who experienced a nursing facility stay at any time during FYs 2004-2006 remained fairly constant, at an estimated 2,000-2,200 individuals. However, the slight decline (8.3 percent) in the number of individuals from 2,228 in FY 2004 to 2,042 in FY 2006 was accompanied by a 10.8 percent increase in the average cost per individual, suggesting an upward trend in costs for this population. The "TBI-Only" group was the largest group (78 percent of the study population in FY 2006), followed by "Anoxia-Only" (14 percent), and "TBI and Anoxia" (8 percent). The "TBI-Only" and "TBI and Anoxia" diagnosis groups appeared to be the "drivers" of the per-user cost increases. The "TBI and Anoxia" group tended to be the heaviest user of the services that were the focus of this study. Total Medicaid costs incurred by the study population while residing in nursing facilities during FY 2006 was \$109.4 million.

The data suggest that individuals aged 18-49 and 50-64 are primarily responsible for the upward trend in costs, while costs and utilization for the group aged 65+ are declining. The "TBI-Only" and "Anoxia-Only" groups are approximately 55 percent female and 45 percent male, with costs apportioned similarly. However, the "TBI and Anoxia" group was 41 percent female and 59 percent male in FY 2006, with slightly higher costs for the males. In FY 2006, 84 percent of the study population was located in the Baltimore-Washington region, perhaps reflecting not only the distribution of the population across the state, but also the availability of nursing homes, rehabilitation facilities, and tertiary care hospitals.

In FY 2006, dual eligibles comprised about three-quarters of the study population and accounted for about two-thirds of Medicaid costs. Dual eligibles have proportionately lower Medicaid costs because some of their care is paid for by Medicare. Total costs for dual eligibles were \$71.5 million in FY 2006, compared to \$37.8 million for Medicaid-only beneficiaries. Over half (55 percent) of the dual eligibles resided in the nursing facility for 11 months or longer (301-366 days), compared to 45 percent of the Medicaid-only beneficiaries. However, the average cost per user for these long-stay Medicaid-only beneficiaries (\$101,064) was 53 percent higher than for the dual eligibles (\$66,190).

Individuals with long stays in nursing facilities consume proportionately more services. For example, 52 percent of the study population resided in a nursing facility for 300 days or longer in FY 2006 and were responsible for 73 percent of costs. Inpatient hospitalizations accounted for 22 percent of this long-stay group's costs, for an average of \$43,800 per person.



Costs for psychotropic medications by the study population totaled \$1.9 million in FY 2006. The most commonly used classes of psychotropic medications were antidepressants, antipsychotics, benzodiazepines, and miscellaneous anticonvulsants. The “top three” pairs of medications for each of the three diagnosis groups included the following: antidepressants and antipsychotics; antipsychotics and benzodiazepines; and benzodiazepines and miscellaneous anticonvulsants.

In summary, the “TBI-Only” and “TBI and Anoxia” diagnosis groups make up the majority of the study population and appear to be driving the utilization and cost increases observed in the study population. Overall, the number of individuals in the study population declined by 8.3 percent from FY 2004 to FY 2006, but costs increased by 1.6 percent. Dual eligibles account for three-quarters of the individuals studied, but the average per-person cost to Medicaid is significantly lower than for Medicaid-only individuals because of the dual eligibles’ Medicare coverage. For Maryland’s MFP demonstration to succeed in transitioning persons with brain injury from institutional settings to the community, it will be important to ensure that appropriate community-based mental health services, occupational/physical/speech therapies, and durable medical equipment are available to this population. In addition, because psychotropic medication utilization is significant among this population, medication use must be carefully managed and monitored.



Introduction

While much is known about the health care utilization patterns of older adults and individuals with physical disabilities who participate in the Maryland Medicaid program, little is known about individuals in the Medicaid program with traumatic brain injury. Maryland, like many other states, is working to rebalance its long-term care system from one that is dependent on institutional services to one that offers a wide array of community-based supports and services. Maryland's Money Follows the Person (MFP) demonstration, which was approved by the Centers for Medicare and Medicaid Services (CMS) in 2007 and began enrolling participants in the spring of 2008, is integral to the state's rebalancing efforts. Ensuring that adequate mental and behavioral health support services are available in the community for persons with brain injury who are transitioning out of institutions will be important to the success of MFP.

The Maryland Department of Health and Mental Hygiene (DHMH), on behalf of Maryland's MFP demonstration, requested that The Hilltop Institute conduct a study to provide a better understanding of service utilization by Medicaid beneficiaries with traumatic brain injury who reside in nursing facilities. Findings from this study will help MFP better plan for the needs of persons with brain injury who seek to transition from institutions to the community.



Background

Over the past two decades, states have begun to develop service delivery systems to meet the needs of individuals with brain injury and their families. These systems generally offer information and referral; service coordinators; rehabilitation; in-home support; personal care; counseling; transportation; housing; vocational and return-to-work programs; and other support services that are funded by state appropriations, designated funding (trust funds), Medicaid, and training and service programs under the federal Rehabilitation Act.

Maryland's MFP program offers a new opportunity to address the needs of persons with brain injury and their families. In 2007, Maryland was chosen by CMS to be among the first states to participate in the MFP Rebalancing Demonstration authorized by the Deficit Reduction Act of 2005. The program, administered by DHMH, is helping the state to address the institutional bias in long-term care by improving the availability and quality of community-based services while providing people in institutions the option to be served in the community.

Stakeholders have been actively involved in the development and implementation of Maryland's MFP demonstration. A stakeholder group meets regularly to provide oversight and advice on state policy, monitor progress with program implementation, and suggest ways to improve program design and implementation. Stakeholders identified mental and behavioral health as an issue in need of particular attention because mental health issues occurring along with frailty, physical disability, and social isolation can derail what might otherwise be a successful transition to the community. Stakeholders were especially concerned that existing mental health services in the community would not be adequate to serve individuals transitioning from institutions.

In response to these concerns, DHMH, working with the state's Mental Hygiene Administration (MHA), formed a behavioral health workgroup charged with addressing a variety of MFP-related issues pertaining to persons with dementia, mental illness, brain injury, and other cognitive disabilities. The behavioral health workgroup organized subgroups focusing on Medicaid beneficiaries in Institutions for Mental Disease (IMDs), aging adults with mental health and cognitive disabilities, and persons with brain injury. The subgroup concerned with brain injury requested that this study be carried out in order to inform MFP implementation and to help ensure that appropriate and adequate community-based services are available in the community for persons with brain injury.



Study Purpose

In consultation with the MFP behavioral health workgroup, The Hilltop Institute designed a study to address the following research questions:

1. How many Medicaid-eligible individuals with traumatic brain injury are cared for in nursing facilities in Maryland? Is the number increasing or decreasing?
2. How many of these individuals have a diagnosis of traumatic brain injury, anoxia,² or both?
3. How many of these individuals are eligible for both Medicaid and Medicare (“dual eligibles”)?
4. What are the demographic characteristics of these individuals—i.e., age, gender, and region of residence?
5. What is the cost of caring for these individuals in nursing facilities?
6. What kinds of health services do these individuals use while residing in a nursing facility and what is the cost of those services?
7. What kinds of psychotropic medications do these individuals use while residing in a nursing facility, and what is the cost of those medications?

² Anoxia, or anoxic brain damage, is caused by an inadequate flow of oxygen to the brain.



Methodology

Defining the Study Population

Hilltop defined the study population to be Maryland Medicaid beneficiaries who a) received a diagnosis of traumatic brain injury (TBI), anoxia, or both TBI and anoxia at some time during fiscal years (FYs) 1994-2006 and b) resided in a Maryland nursing facility at some point during FYs 2004-2006.

Identifying the Study Population

Data from the federal Minimum Data Set (MDS) for Nursing Home Resident Assessment and Care Screening³ and Maryland MMIS files were used to identify the study population. Searching each of the two data sources separately, Hilltop identified individuals meeting the criteria for the study population within each data source and then merged the two “finder files” together to produce a single, unduplicated finder file. The method is described in greater detail below.

Step 1: Search the MDS Records

Hilltop conducted a search of MDS records for FYs 1999-2006.⁴ This search identified Medicaid beneficiaries for whom a) the “Traumatic Brain Injury” code was marked under “Disease Diagnoses,” Section I.1.cc.,⁵ and/or b) one of the ICD-9 codes shown in Exhibit 1 was listed under “Other Current or More Detailed Diagnoses and ICD-9 Codes,” Section I.3.a-e. The search was then narrowed to include only those Medicaid beneficiaries who had one or more Medicaid nursing facility claims during FYs 2004-2006.

For individuals who were found to have a diagnosis of brain injury in the MDS records (i.e., TBI, anoxia, or both), the search found 501 individuals with nursing facility claims in FY 2004, 517 individuals with nursing facility claims in FY 2005, and 539 individuals with nursing facility claims in FY 2006. It is important to note that these are duplicated counts, as some individuals may have had nursing facility claims during more than one fiscal year.

³ The MDS is a standardized tool administered to all nursing home residents—regardless of payment source—to assess care needs. This study examined the MDS records of Medicaid beneficiaries in Maryland, including those who are dually eligible for Medicare and Medicaid.

⁴ MDS data were available beginning in 1999, whereas MMIS data—also used in this study—were available beginning in 1994.

⁵ It is important to note that diagnoses are indicated in the MDS only if the diagnosis is related to the person’s needs (e.g., activities of daily living limitations) in the nursing home. It is therefore reasonable to assert that if the TBI field is marked, the person is a nursing home resident with a “true” TBI.



Exhibit 1.
ICD-9 Codes Used to Identify the Study Population

In consultation with DHMH and MHA, Hilltop used the following ICD-9 codes to identify the study population. These codes are consistent with the definition of traumatic brain injury used by the Centers for Disease Control and Prevention (CDC).

<u>TBI-Only</u>	<u>Anoxia-Only</u>	<u>TBI and Anoxia</u>
800.0-801.9	348.1	800.0-801.9
803.0-804.9		803.0-804.9
850.0-854.05		850.0-854.05
950.01-950.3		950.01-950.3
995.55		959.01*
		995.55
		... combined with ...
		348.1

* In the first run of MMIS data, Hilltop included ICD-9 code 959.01 (“brain injury-non-specific”) to identify the TBI-only population. The result was a finder file that was indefensibly high based on other studies of TBI patients in nursing homes. Hilltop consulted with MHA, who consulted with a DHMH epidemiologist who managed the TBI surveillance grants from the CDC. A decision was made to eliminate ICD-9 code 959.01 from the TBI-only group, as the consensus view was that it is “too general” and most likely over-utilized by physicians when a diagnosis was uncertain. Eliminating this code resulted in a finder file of a size more consistent with other studies. However, ICD-9 code 959.01 was retained in the “TBI and Anoxia” group because it was believed that this code may include persons with anoxia that might otherwise be missed.

Step 2: Search the MMIS Data

Similar to the process followed for the MDS search in Step 1, this step involved a search of all Medicaid historical files for FYs 1994-2006 to identify individuals who had a) one or more of the ICD-9 codes shown in Exhibit 1 at any time during FYs 1994-2006 and b) one or more Medicaid nursing facility claims during FYs 2004-2006.

For individuals who were found to have a diagnosis of brain injury, the search found 1,784 individuals with nursing facility claims in FY 2004, 1,747 individuals with nursing facility claims in FY 2005, and 1,675 individuals with nursing facility claims in FY 2006. Again, these are duplicated counts because some individuals may have had nursing facility claims during more than one fiscal year.

Step 3: Combine the MDS Finder Files and MMIS Data Finder Files

The MDS finder files were combined with the MMIS data finder files to produce a single unduplicated list of individuals who met the aforementioned study criteria during each of the three fiscal years. Individuals meeting the study criteria totaled 2,228 in FY 2004, 2,206 in FY



2005, and 2,042 in FY 2006. For each fiscal year, three mutually exclusive finder files by diagnosis were produced: TBI-Only, Anoxia-Only, and TBI and Anoxia.

Defining a Nursing Facility Experience

For this study, a nursing facility experience was defined as days for which a Medicaid beneficiary had nursing facility claims during a fiscal year. If a beneficiary had an inpatient hospital claim(s) for a hospital stay contained within a nursing facility experience (i.e., either concurrent with a nursing facility claim, or immediately after the day on which a nursing facility claim ended and immediately prior to the day on which the following nursing facility claim began), the inpatient hospital stay was considered to be part of the nursing facility experience. “Bed holds” (i.e., when a beneficiary entered the hospital from a nursing facility and the nursing facility “held” the individual’s nursing home bed) were also considered to be part of a nursing facility experience.

Using this definition for a nursing facility experience, it is possible that a beneficiary was discharged from a nursing facility on Day X and incurred claims for community-based services on Day X as well (e.g., home health). Such services would be included in the “Other” category discussed below. Hilltop did not screen out claims such as those for post-discharge community-based services.

Identifying Services to Be Studied

At the request of DHMH and the MFP behavioral health workgroup, Hilltop studied utilization of services by the study population in the categories listed in Exhibit 2. The workgroup believed that these services were most relevant to understanding the potential service needs of persons with brain injury who may seek to transition from institutions to the community.

It is important to note that the service categories listed in Exhibit 2 do not include all of the services the study population received while residing in nursing facilities. In addition to these categories, the study population received services under the following codes: dental, home health, outpatient, non-psychotropic pharmacy, physician, and special programs. Collectively, these services are indicated as “Other” services in the study findings.⁶

⁶ See “Defining a Nursing Facility Experience” above for a further explanation of services likely included in the “Other” category.



**Exhibit 2.
Services Examined in the Study**

Durable Medical Equipment
Emergency Department Visits
Inpatient Hospitalizations
Mental Health*
Nursing Facility Costs**
Occupational, Physical, and Speech Therapies***
Psychotropic Medications****

* Includes the following codes: Psychiatric Rehab Service Facility, Psychologist, Nurse Psychotherapist (Indiv. Group).

** Per diem costs paid to the nursing home.

*** Includes code for Physical Therapy; no individual codes exist for Occupational Therapy and Speech Therapy, so a program previously developed by Hilltop was used to identify utilization of these services. The program searches certain revenue codes, provider codes, and procedure codes.

**** See Exhibit 3.

The study did not break down nursing facility costs by nursing facility level-of-care. Nor did the study include a search of Medicaid HealthChoice encounter data. HealthChoice managed care organizations are only responsible for HealthChoice participants who enter a nursing facility for 30 days. If the participant remains in the nursing facility after that time, the participant is disenrolled from HealthChoice and becomes a fee-for-service Medicaid beneficiary. Fee-for-service costs are included in the Medicaid claims data, so nursing facility stays associated with fee-for-service beneficiaries are included in this study.

Identifying Psychotropic Medications to Be Studied

In consultation with the MFP behavioral health workgroup and Hilltop's staff with expertise in behavioral health, Hilltop studied utilization of a group of psychotropic medications commonly used to treat mental illness (Exhibit 3).



**Exhibit 3.
Psychotropic Medications Included in the Study**

<u>Code</u>	
281604	Antidepressants
282800	Antimanic
281608	Antipsychotics
282404, 281204	Barbiturates
272408, 281208	Benzodiazepines
281292	Miscellaneous anticonvulsants
282092	Miscellaneous stimulants
281600, 281612	Psychotherapeutic
282400, 282492	Sedatives
282000, 282004	Stimulants

The Analysis

The analysis was confined to the study population identified through the search of MDS and MMIS data—i.e., Medicaid beneficiaries who had a) a TBI and/or anoxia diagnosis at some time during FYs 1994-2006, and b) one or more Medicaid nursing facility claims during FYs 2004-2006. The study population was divided into three mutually-exclusive diagnosis groups for the analysis: TBI-Only, Anoxia-Only, and TBI and Anoxia.

For each of the service categories listed in Exhibit 2, Hilltop examined Medicaid costs during nursing facility experiences by the study population during FYs 2004-2006 using Medicaid claims (including Medicare crossover claims). Medicaid costs of individuals in the study population that were incurred when the individual was not residing in a nursing facility are not included in this study.⁷

Hilltop compared Medicaid-only beneficiaries and dual eligibles to determine whether there were significant differences in costs between these two groups. Hilltop also examined the costs and utilization patterns of individuals with nursing home experiences of more than 300 days in a single fiscal year.

For each of the drug classes listed in Exhibit 3, Hilltop examined psychotropic drug utilization and costs for the study population during a nursing facility stay in FYs 2004, 2005, or 2006—specifically, the number of users of psychotropic drugs in the study population, the number of prescriptions written, the average number of prescriptions per user, the average days’ supply per user, and costs. Hilltop also examined the most frequently occurring combinations of psychotropic drugs used by the study population.

⁷ See section above entitled “Defining a Nursing Facility Experience” for the operational definition used in this study.



Findings

Number of Users and Costs

The number of Medicaid beneficiaries with a diagnosis of TBI and/or anoxia who experienced a nursing facility stay in FYs 2004, 2005, or 2006 remained fairly constant at an estimated 2,000-2,200 individuals (Table 1). However, the slight decline in the number of individuals from 2,228 to 2,042 (8.3 percent decrease) and the number of nursing facility days from 582,596 to 527,748 (9.4 percent decrease) was accompanied by a 10.8 percent increase in the average cost per individual (from \$48,336 to \$53,562), suggesting an upward trend in costs for this population.⁸ Total Medicaid costs incurred by the study population while residing in nursing facilities during FY 2006 was \$109.4 million.⁹

Table 1. Number of Days in Nursing Facilities and Related Medicaid Costs for the Study Population, FYs 2004-2006

	Total Unique Users	Nursing Facility Days		Medicaid Costs	
		Average Number of Days	Total Number of Days	Average Cost per Unique User	Total Costs
FY 2004	2,228	262	582,596	\$48,336	\$107,693,240
FY 2005	2,206	238	524,069	\$50,170	\$110,676,036
FY 2006	2,042	258	527,748	\$53,562	\$109,374,192

Table 2 shows Medicaid costs for the study population by diagnosis group. The “TBI-Only” group comprised 78 percent of the study population in FY 2006 and accounted for 74 percent of the costs during that year. However, as shown in Table 3, the average cost per user is highest for the “TBI and Anoxia” group (\$69,442 in FY 2006); second highest for “Anoxia-Only” (\$58,184 in FY 2006); and lowest for the “TBI-Only” group (\$51,136 in FY 2006). Similarly, average cost per nursing facility day is highest for the “TBI and Anoxia” group (\$268 per day in FY 2006), followed by “Anoxia-Only” (\$243 per day) and “TBI-Only” (\$195 per day) (see Table 3). However, the average number of nursing facility days is highest for the “TBI-Only” group (262 days in FY 2006).

From FY 2004 to FY 2006, the TBI-Only population declined in number by 8.8 percent, but costs increased by 2.2 percent. At the same time, the “TBI and Anoxia” group increased in number by 6.8 percent, with a cost increase double that amount at 13.6 percent. Although the

⁸ Note that no adjustment has been made for any increases in nursing facility rates during the study period.

⁹ In the tables that follow, “Total Medicaid Costs” includes the costs of those services that are the focus of this study (see Exhibit 2), as well as “Other” Medicaid costs, which includes dental, home health, outpatient, non-psychotropic pharmacy, physician, and special programs.



“TBI-Only” group had the lowest average per-user cost, this group comprised more than three-quarters of the study population and is experiencing modest cost growth. Consequently, the sheer numbers of the “TBI-Only” group are likely to place significant upward pressure on overall costs. This analysis suggests that together, the “TBI-Only” and “TBI and Anoxia” groups appear to be the “drivers” of the per-user cost increase in Table 1.

Table 2. Medicaid Costs by Diagnosis Group for the Study Population While Residing in Maryland Nursing Facilities, FYs 2004-2006

	FY 2004		FY 2005		FY 2006	
	Total Unique Users	Total Costs	Total Unique Users	Total Costs	Total Unique Users	Total Costs
TBI-Only	1,744	\$79,555,604	1,703	\$80,408,441	1,590	\$81,307,389
Anoxia-Only	337	\$18,541,547	344	\$18,948,369	295	\$17,164,333
TBI & Anoxia	147	\$9,596,090	159	\$11,319,226	157	\$10,902,470
Total	2,228	\$107,693,240	2,206	\$110,676,036	2,042	\$109,374,192

Table 3. Average Number of Nursing Facility Days and Average Medicaid Costs per User by Diagnosis Group, FYs 2004-2006

	FY 2004			FY 2005			FY 2006		
	Average Number of NF Days	Average Cost Per Unique User	Average Cost per NF Day	Average Number of NF Days	Average Cost Per Unique User	Average Cost per NF Day	Average Number of NF Days	Average Cost Per Unique User	Average Cost per NF Day
TBI-Only	262	\$45,617	\$174	259	\$47,216	\$182	262	\$51,136	\$195
Anoxia-Only	256	\$55,019	\$215	240	\$55,082	\$230	239	\$58,184	\$243
TBI & Anoxia	268	\$65,280	\$244	273	\$71,190	\$261	259	\$69,442	\$268



Service Utilization

Tables 4-7 show Medicaid costs incurred by the study populations (TBI-Only, Anoxia-Only, TBI and Anoxia, and All Diagnosis Groups, respectively) by service category while residing in nursing facilities during FYs 2004-2006. Consistent with the average per-user costs in Table 3, service use within the “TBI and Anoxia” diagnosis group tended to be heavier. For example, in FY 2006:

- For the “TBI and Anoxia” group, **nursing facility** costs (\$8.3 million) represented about three-quarters of total costs, compared to about 80 percent for the “Anoxia-Only” group (\$13.8 million), and 86 percent for the “TBI-Only” group (\$69.9 million). This is because the “TBI and Anoxia” group used proportionately more services in the other categories listed in Tables 4, 5, and 6. Overall, nursing facility per diem costs totaled \$91.9 million for the three groups in FY 2006.
- Forty-eight percent of the “TBI and Anoxia” group used **inpatient hospital** services during a nursing facility stay (accounting for 13 percent of total costs for that group), compared to 33 percent in the “Anoxia-Only” group (10 percent of total costs), and 24 percent in the “TBI-Only” group (5 percent of total costs). Overall, the cost of inpatient hospital services for all three groups totaled \$6.7 million in FY 2006.
- Forty-eight percent of the “TBI and Anoxia” group used the **emergency department** during nursing facility stays, compared to 37 percent in the “Anoxia-Only” group and 35 percent in the “TBI-Only” group. However, in all groups, emergency department costs accounted for less than 1 percent of total costs (\$123,251).
- In all groups, about three-quarters of the population used **psychotropic medications**, accounting for an estimated 2 percent of total costs across all study years. Psychotropic medication costs totaled \$1.9 million in FY 2006 for all three groups.¹⁰
- **Mental health, occupational/physical/speech therapies, and durable medical equipment** each accounted for less than 1 percent of total costs for each of the three diagnosis groups across all study years. However, users of occupational/physical/speech therapies ranged from 14 percent to 20 percent of the population in each diagnosis group.
- For all diagnosis groups, “**Other**” costs accounted for 7 percent to 9 percent of total costs and exhibited a slightly downward trend from FY 2004 to FY 2006. These costs include dental, home health, outpatient, non-psychotropic pharmacy, physician, and special program services.

¹⁰ Medicare Part D, introduced on January 1, 2006, covered medications for dual eligibles during the second half of FY 2006. Therefore, care must be taken in interpreting expenditure data for psychotropic medications.



Table 4. TBI-Only Diagnosis Group: Medicaid Costs for All Services Received While in Maryland Nursing Facilities, FYs 2004-2006

Service	FY 2004				FY 2005				FY 2006			
	Total Users*	% of Total Users	Total Costs	% of Total Costs	Total Users	% of Total Users	Total Costs	% of Total Costs	Total Users	% of Total Users	Total Costs	% of Total Costs
Emergency Department Visits	659	38%	\$64,073	<1%	587	34%	\$67,665	<1%	558	35%	\$80,409	<1%
Inpatient Hospital	466	27%	\$3,688,199	5%	440	26%	\$3,597,356	4%	388	24%	\$3,693,489	5%
Nursing Facility	1,744	100%	\$66,298,275	83%	1,703	100%	\$67,125,095	83%	1,590	100%	\$69,897,373	86%
Mental Health	65	4%	\$37,735	<1%	59	3%	\$35,807	<1%	53	3%	\$39,708	<1%
Occupational, Physical & Speech Therapies	230	13%	\$45,793	<1%	249	15%	\$55,325	<1%	314	20%	\$102,513	<1%
Durable Medical Equipment	41	2%	\$55,162	<1%	28	2%	\$56,900	<1%	28	2%	\$59,901	<1%
Psychotropic Medications	1,313	75%	\$2,130,566	3%	1,272	75%	\$2,224,971	3%	1,203	76%	\$1,506,649	2%
Other**	1,711	98%	\$7,235,801	9%	1,672	98%	\$7,245,323	9%	1,570	99%	\$5,927,348	7%
Total Costs			\$79,555,604	100%			\$80,408,441	100%			\$81,307,390	100%

*"Total Users" is an unduplicated count within each service category but a duplicated count across service categories.

**Includes dental, home health, outpatient, non-psychotropic pharmacy, physician, and special program services.



Table 5. Anoxia-Only Diagnosis Group: Medicaid Costs for All Services Received While in Maryland Nursing Facilities, FYs 2004-2006

Service	FY 2004				FY 2005				FY 2006			
	Total Users*	% of Total Users	Total Costs	% of Total Costs	Total Users	% of Total Users	Total Costs	% of Total Costs	Total Users	% of Total Users	Total Costs	% of Total Costs
Emergency Department Visits	128	38%	\$14,956	<1%	144	42%	\$17,007	<1%	110	37%	\$21,715	<1%
Inpatient Hospital	113	34%	\$1,325,441	7%	132	38%	\$1,416,067	7%	97	33%	\$1,635,170	10%
Nursing Facility	337	100%	\$14,842,351	80%	344	100%	\$15,313,907	81%	295	100%	\$13,793,484	80%
Mental Health	18	5%	\$3,798	<1%	11	3%	\$4,208	<1%	12	4%	\$4,546	<1%
Occupational, Physical & Speech Therapies	28	8%	\$4,044	<1%	42	12%	\$7,077	<1%	41	14%	\$12,496	<1%
Durable Medical Equipment	6	2%	\$9,884	<1%	6	2%	\$8,147	<1%	9	3%	\$3,959	<1%
Psychotropic Medications	243	72%	\$349,084	2%	242	70%	\$345,115	2%	210	71%	\$201,396	1%
Other**	332	99%	\$1,991,989	11%	339	99%	\$1,836,840	10%	289	98%	\$1,491,567	9%
Total Costs			\$18,541,547	100%			\$18,948,369	100%			\$17,164,333	100%

*"Total Users" is an unduplicated count within each service category but a duplicated count across service categories.

**Includes dental, home health, outpatient, non-psychotropic pharmacy, physician, and special program services.



Table 6. TBI and Anoxia Diagnosis Group: Medicaid Costs for All Services Received While in Maryland Nursing Facilities, FYs 2004-2006

Service	FY 2004				FY 2005				FY 2006			
	Total Users*	% of Total Users	Total Costs	% of Total Costs	Total Users	% of Total Users	Total Costs	% of Total Costs	Total Users	% of Total Users	Total Costs	% of Total Costs
Emergency Department Visits	77	52%	\$14,530	<1%	78	49%	\$21,999	<1%	76	48%	\$21,127	<1%
Inpatient Hospital	62	42%	\$1,208,945	13%	72	45%	\$1,378,609	12%	76	48%	\$1,400,059	13%
Nursing Facility	147	100%	\$7,161,490	75%	159	100%	\$8,476,191	75%	157	100%	\$8,279,004	76%
Mental Health	8	5%	\$1,618	<1%	13	8%	\$12,041	<1%	9	6%	\$3,404	<1%
Occupational, Physical & Speech Therapies	14	10%	\$4,065	<1%	18	11%	\$6,938	<1%	25	16%	\$8,336	<1%
Durable Medical Equipment	2	1%	\$333	<1%	5	3%	\$15,528	<1%	10	6%	\$2,998	<1%
Psychotropic Medications	113	77%	\$219,741	2%	119	75%	\$264,059	2%	114	73%	\$190,442	2%
Other**	145	99%	\$985,367	10%	156	98%	\$1,143,861	10%	155	99%	\$997,100	9%
Total Costs			\$9,596,089	100%			\$11,319,226	100%			\$10,902,470	100%

*"Total Users" is an unduplicated count within each service category but a duplicated count across service categories.

**Includes dental, home health, outpatient, non-psychotropic pharmacy, physician, and special program services.



Table 7. All Diagnosis Groups: Medicaid Costs for All Services Received While in Maryland Nursing Facilities, FYs 2004-2006

Service	FY 2004					FY 2005					FY 2006				
	Total Users*	% of Total Users	Average Cost per User	Total Costs	% of Total Costs	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs
Emergency Department Visits	864	39%	\$108	\$93,559	<1%	809	37%	\$132	\$106,671	<1%	744	36%	\$166	\$123,251	<1%
Inpatient Hospital	641	29%	\$9,708	\$6,222,585	6%	644	29%	\$9,926	\$6,392,032	6%	561	27%	\$11,994	\$6,728,718	6%
Nursing Facility	2,228	100%	\$39,633	\$88,302,116	82%	2,206	100%	\$41,213	\$90,915,193	82%	2,042	100%	\$45,039	\$91,969,861	84%
Mental Health	91	4%	\$474	\$43,151	<1%	83	4%	\$627	\$52,056	<1%	74	4%	\$644	\$47,658	<1%
Occupational, Physical & Speech Therapies	272	12%	\$198	\$53,902	<1%	309	14%	\$224	\$69,340	<1%	380	19%	\$325	\$123,345	<1%
Durable Medical Equipment	49	2%	\$1,334	\$65,379	<1%	39	2%	\$2,066	\$80,575	<1%	47	2%	\$1,423	\$66,858	<1%
Psychotropic Medications	1,669	75%	\$1,617	\$2,699,391	3%	1,633	74%	\$1,736	\$2,834,145	3%	1,527	75%	\$1,243	\$1,898,487	2%
Other**	2,188	98%	\$4,668	\$10,213,157	9%	2,167	98%	\$4,719	\$10,226,024	9%	2,014	99%	\$4,179	\$8,416,015	8%
Total Costs				\$107,693,240	100%				\$110,676,036	100%				\$109,374,193	100%

*"Total Users" is an unduplicated count within each service category but a duplicated count across service categories.

**Includes dental, home health, outpatient, non-psychotropic pharmacy, physician, and special program services.



Table 8 shows, for all diagnosis groups, the highest cost per user and the average cost per user for each of the service categories. In FY 2005, annual nursing facility costs for a single individual reached a high of \$283,876, and inpatient hospital services topped out at \$181,627 for a single user. There was a notable increase in the “high” for durable medical equipment, from \$13,411 in FY 2004 to \$41,616 in FY 2006.

All service categories show an upward trend in the average cost per user from FY 2004 to FY 2006, with the exception of durable medical equipment and psychotropic medications. Of particular note are occupational/physical/speech therapies, which increased by 64.1 percent over the three-year period; mental health services, which increased by 35.9 percent; and emergency department visits, which increased by 53.7 percent.

Table 8. All Diagnosis Groups: Highest Cost per User and Average Cost per User in Each Service Category, FYs 2004-2006

Service	FY 2004		FY 2005		FY 2006	
	Highest Cost Per User	Average Cost Per User	Highest Cost Per User	Average Cost Per User	Highest Cost Per User	Average Cost Per User
Emergency Department Visits	\$1,584	\$108	\$1,594	\$132	\$1,876	\$166
Inpatient Hospital	\$136,790	\$9,708	\$181,627	\$9,926	\$139,796	\$11,994
Nursing Facility	\$213,467	\$39,633	\$283,876	\$41,213	\$232,227	\$45,039
Mental Health	\$3,956	\$474	\$4,189	\$627	\$4,726	\$644
Occupational, Physical & Speech Therapies	\$1,626	\$198	\$2,222	\$224	\$3,063	\$325
Durable Medical Equipment	\$13,411	\$1,334	\$27,172	\$2,066	\$41,616	\$1,423
Psychotropic Medications	\$18,929	\$1,617	\$17,819	\$1,736	\$14,161	\$930



Age, Gender, and Area of Residence

The data suggest that, across all diagnosis groups, nursing facilities are caring for an increasing number of individuals under age 65 with “TBI and Anoxia” (Table 9). From FY 2004 to FY 2006, the number of individuals in all diagnosis groups aged 65 and over declined by 12.8 percent (from 1,278 to 1,115 individuals), while the number of individuals under age 65 decreased by only 2.4 percent (from 950 to 927 individuals).

Table 9. Number of Users Under and Over Age 65 by Diagnosis Group, FYs 2004-2006

	FY 2004	FY 2005	FY 2006
< Age 65			
TBI-Only	636	630	619
Anoxia-Only	192	196	173
TBI & Anoxia	122	135	135
Total	950	961	927
Age 65+			
TBI-Only	1,108	1,073	971
Anoxia-Only	145	148	122
TBI & Anoxia	25	24	22
Total	1,278	1,245	1,115

Table 10 shows the percentage change in the number of individuals and costs from FY 2004 to FY 2006 by age and diagnosis group. Overall, the number of individuals declined by 8.3 percent, but costs increased by 1.6 percent. Further examination of Table 9 indicates the following trends specific to age and diagnosis groups:

- **“TBI-Only” diagnosis group:** The group aged 18-49 declined in number by 7.1 percent from FY 2004 to FY 2006, but experienced a 14.9 percent increase in costs. The number of users within the group aged 50-64 remained fairly stable; however, there was a 14.6 percent increase in costs. At the same time, there was a 12.4 percent decline in the number of individuals aged 65+, with a concomitant decline in this group’s costs.
- **“Anoxia-Only” diagnosis group:** The number of individuals aged 18-49 remained fairly stable from FY 2004 to FY 2006, but costs increased by 11.1 percent. Among those aged 50-64, numbers declined by 15.3 percent and costs decreased by 5.2 percent. In the 65+ group, numbers declined by 15.9 percent and costs decreased by 22.8 percent.
- **“TBI and Anoxia” diagnosis group:** The groups aged 18-49 and 50-64 increased in number (11.0 percent and 10.2 percent, respectively) from FY 2004 to FY 2006. Costs for these two groups also increased (by 16.5 percent and 19.1 percent, respectively). The group aged 65+ declined in both numbers and costs.



**Table 10. Percentage Change in the Number of Users and Costs
by Age and Diagnosis Group, FY 2004 to FY 2006**

Age	TBI-Only		Anoxia-Only		TBI and Anoxia		All Diagnoses	
	Users	Costs	Users	Costs	Users	Costs	Users	Costs
18-49	(7.1%)	14.9%	(2.5%)	11.1%	11.0%	16.5%	(3.3%)	14.5%
50-64	1.2%	14.6%	(15.3%)	(5.2%)	10.2%	19.1%	(1.6%)	10.2%
65+	(12.4%)	(6.4%)	(15.9%)	(22.8%)	(12.0%)	(11.5%)	(12.8%)	(8.5%)
All Ages	(8.8%)	2.2%	(12.5%)	(7.4%)	6.8%	13.6%	(8.3%)	1.6%

Tables 11-14 provide more detailed information on users and costs by age, as well as by gender and region, for the three diagnosis groups and the population as a whole. For example, in FY 2006, the “TBI-Only” and “Anoxia-Only” groups were approximately 55 percent female and 45 percent male, with costs apportioned similarly. However, the “TBI and Anoxia” group was 41 percent female and 59 percent male in FY 2006, with slightly higher costs for the males.

In FY 2006, 84 percent of the study population was located in the Baltimore-Washington region, perhaps reflecting not only the distribution of the population across the state, but also the availability of nursing homes, rehabilitation facilities, and tertiary care hospitals.



**Table 11. TBI-Only: Nursing Facility Days and Medicaid Costs by Age, Gender, and Region,
FYs 2004-2006**

	FY 2004					FY 2005					FY 2006				
	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs
Age Group															
0-17	0	0%	\$0	\$0	0%	1	0%	\$30,580	\$30,580	0%	0	0%	\$0	\$0	0%
18-49	295	17%	\$50,159	\$14,796,937	19%	288	17%	\$52,596	\$15,147,635	19%	274	17%	\$62,055	\$17,002,995	21%
50-64	341	20%	\$51,384	\$17,521,922	22%	341	20%	\$55,275	\$18,848,625	23%	345	22%	\$58,180	\$20,072,039	25%
65+	1108	64%	\$42,632	\$47,236,745	59%	1073	63%	\$43,226	\$46,381,620	58%	971	61%	\$45,553	\$44,232,356	54%
Gender															
Female	961	55%	\$45,733	\$43,949,587	55%	939	55%	\$46,251	\$43,429,361	54%	878	55%	\$49,280	\$43,267,692	53%
Male	783	45%	\$45,474	\$35,606,017	45%	764	45%	\$48,402	\$36,979,099	46%	712	45%	\$53,427	\$38,039,697	47%
Region															
Baltimore City	561	32%	\$49,190	\$27,595,464	35%	546	32%	\$51,565	\$28,154,603	35%	526	33%	\$55,626	\$29,259,496	36%
Baltimore Suburban	358	21%	\$42,434	\$15,191,297	19%	356	21%	\$42,738	\$15,214,643	19%	322	20%	\$47,410	\$15,266,159	19%
Eastern Shore	184	11%	\$39,555	\$7,278,161	9%	172	10%	\$41,053	\$7,061,114	9%	163	10%	\$45,972	\$7,493,386	9%
Southern Maryland	100	6%	\$42,124	\$4,212,392	5%	90	5%	\$45,899	\$4,130,888	5%	93	6%	\$46,697	\$4,342,816	5%
Washington Suburban	380	22%	\$48,735	\$18,519,481	23%	394	23%	\$50,681	\$19,968,165	25%	357	22%	\$54,095	\$19,312,001	24%
Western Maryland	161	9%	\$41,980	\$6,758,808	8%	143	8%	\$40,924	\$5,852,142	7%	125	8%	\$43,599	\$5,449,820	7%
Out of State	0	0%	\$0	\$0	0%	2	0%	\$13,453	\$26,906	0%	4	0%	\$45,928	\$183,713	0%



**Table 12. Anoxia-Only: Nursing Facility Days and Medicaid Costs by Age, Gender, and Region,
FYs 2004-2006**

	FY 2004					FY 2005					FY 2006				
	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs
Age Group															
0-17	0	0%	\$0	\$0	0%	0	0%	\$0	\$0	0%	0	0%	\$0	\$0	0%
18-49	81	24%	\$60,737	\$4,919,658	27%	82	24%	\$63,920	\$5,241,464	28%	79	27%	\$69,169	\$5,464,386	32%
50-64	111	33%	\$60,761	\$6,744,487	36%	114	33%	\$63,753	\$7,267,831	38%	94	32%	\$68,014	\$6,393,334	37%
65+	145	43%	\$47,430	\$6,877,402	37%	148	43%	\$43,507	\$6,439,074	34%	122	41%	\$43,497	\$5,306,613	31%
Gender															
Female	190	56%	\$57,346	\$10,895,786	59%	193	56%	\$56,969	\$10,995,071	58%	157	53%	\$62,577	\$9,824,540	57%
Male	147	44%	\$52,012	\$7,645,761	41%	151	44%	\$52,671	\$7,953,298	42%	138	47%	\$53,187	\$7,339,792	43%
Region															
Baltimore City	106	31%	\$54,883	\$5,817,566	31%	116	34%	\$51,552	\$5,979,988	32%	83	28%	\$58,236	\$4,833,547	28%
Baltimore Suburban	85	25%	\$61,040	\$5,188,385	28%	84	24%	\$62,926	\$5,285,790	28%	75	25%	\$62,089	\$4,656,704	27%
Eastern Shore	29	9%	\$46,700	\$1,354,290	7%	26	8%	\$50,893	\$1,323,215	7%	24	8%	\$50,680	\$1,216,314	7%
Southern Maryland	12	4%	\$40,981	\$491,771	3%	7	2%	\$51,034	\$357,238	2%	6	2%	\$58,239	\$349,436	2%
Washington Suburban	81	24%	\$56,907	\$4,609,471	25%	95	28%	\$51,998	\$4,939,774	26%	91	31%	\$56,684	\$5,158,246	30%
Western Maryland	24	7%	\$45,003	\$1,080,064	6%	16	5%	\$66,398	\$1,062,364	6%	16	5%	\$59,380	\$950,086	6%
Out of State	0	0%	\$0	\$0	0%	0	0%	\$0	\$0	0%	0	0%	\$0	\$0	0%



**Table 13. TBI and Anoxia: Nursing Facility Days and Medicaid Costs by Age, Gender, and Region,
FYs 2004-2006**

	FY 2004					FY 2005					FY 2006				
	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs
Age Group															
0-17	0	0%	\$0	\$0	0%	0	0%	\$0	\$0	0%	0	0%	\$0	\$0	0%
18-49	73	50%	\$73,202	\$5,343,754	56%	81	51%	\$77,184	\$6,251,917	55%	81	52%	\$76,864	\$6,225,955	57%
50-64	49	33%	\$60,983	\$2,988,181	31%	54	34%	\$70,397	\$3,801,413	34%	54	34%	\$65,887	\$3,557,912	33%
65+	25	17%	\$50,566	\$1,264,154	13%	24	15%	\$52,746	\$1,265,896	11%	22	14%	\$50,846	\$1,118,603	10%
Gender															
Female	56	38%	\$61,921	\$3,467,550	36%	64	40%	\$63,743	\$4,079,558	36%	65	41%	\$63,985	\$4,159,023	38%
Male	91	62%	\$67,347	\$6,128,539	64%	95	60%	\$76,207	\$7,239,668	64%	92	59%	\$73,298	\$6,743,447	62%
Region															
Baltimore City	57	39%	\$71,612	\$4,081,884	43%	64	40%	\$78,464	\$5,021,720	44%	65	41%	\$75,571	\$4,912,098	45%
Baltimore Suburban	43	29%	\$61,243	\$2,633,443	27%	43	27%	\$67,763	\$2,913,820	26%	40	25%	\$65,018	\$2,600,712	24%
Eastern Shore	12	8%	\$57,672	\$692,059	7%	14	9%	\$72,089	\$1,009,248	9%	13	8%	\$76,049	\$988,642	9%
Southern Maryland	3	2%	\$40,629	\$121,886	1%	3	2%	\$51,947	\$155,841	1%	4	3%	\$50,270	\$201,079	2%
Washington Suburban	24	16%	\$68,280	\$1,638,719	17%	29	18%	\$63,240	\$1,833,962	16%	28	18%	\$67,188	\$1,881,261	17%
Western Maryland	7	5%	\$54,068	\$378,475	4%	6	4%	\$64,106	\$384,636	3%	7	4%	\$45,525	\$318,677	3%
Out of State	1	1%	\$49,623	\$49,623	1%	0	0%	\$0	\$0	0%	0	0%	\$0	\$0	0%



**Table 14. All Diagnosis Groups: Nursing Facility Days and Medicaid Costs by Age, Gender, and Region,
FYs 2004-2006**

	FY 2004					FY 2005					FY 2006				
	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs	Total Users	% of Total Users	Average Cost per User	Total Costs	% of Total Costs
Age Group															
0-17	0	0%	\$0	\$0	0%	1	0%	\$30,580	\$30,580	0%	0	0%	\$0	\$0	0%
18-49	449	20%	\$55,814	\$25,060,349	23%	451	20%	\$59,071	\$26,641,016	24%	434	21%	\$66,114	\$28,693,336	26%
50-64	501	22%	\$54,400	\$27,254,590	25%	509	23%	\$58,778	\$29,917,869	27%	493	24%	\$60,899	\$30,023,285	27%
65+	1278	57%	\$43,332	\$55,378,301	51%	1245	56%	\$43,443	\$54,086,590	49%	1115	55%	\$45,433	\$50,657,572	46%
Gender															
Female	1207	54%	\$48,312	\$58,312,923	54%	1196	54%	\$48,916	\$58,503,990	53%	1100	54%	\$52,047	\$57,251,255	52%
Male	1021	46%	\$48,365	\$49,380,317	46%	1010	46%	\$51,656	\$52,172,065	47%	942	46%	\$55,332	\$52,122,936	48%
Region															
Baltimore City	724	32%	\$51,789	\$37,494,914	35%	726	33%	\$53,934	\$39,156,311	35%	674	33%	\$57,871	\$39,005,141	36%
Baltimore Suburban	486	22%	\$47,352	\$23,013,125	21%	483	22%	\$48,477	\$23,414,253	21%	437	21%	\$51,541	\$22,523,575	21%
Eastern Shore	225	10%	\$41,442	\$9,324,510	9%	212	10%	\$44,309	\$9,393,577	8%	200	10%	\$48,492	\$9,698,342	9%
Southern Maryland	115	5%	\$41,966	\$4,826,049	4%	100	5%	\$46,440	\$4,643,967	4%	103	5%	\$47,508	\$4,893,331	4%
Washington Suburban	485	22%	\$51,067	\$24,767,671	23%	518	23%	\$51,625	\$26,741,901	24%	476	23%	\$55,360	\$26,351,508	24%
Western Maryland	192	9%	\$42,799	\$8,217,347	8%	165	7%	\$44,237	\$7,299,142	7%	148	7%	\$45,396	\$6,718,583	6%
Out of State	1	0%	\$49,623	\$49,623	0%	2	0%	\$13,453	\$26,906	0%	4	0%	\$45,928	\$183,713	0%



Dual Eligibles

In FY 2006, dual eligibles comprised about three-quarters of the study population and accounted for about two-thirds of Medicaid costs (Table 15). Dual eligibles have proportionately lower Medicaid costs because some of their care is paid for by Medicare. In FY 2006, total costs were \$71.5 million for dual eligibles, compared to \$37.8 million for Medicaid-only beneficiaries.

Table 15. Medicaid Costs for Dual Eligibles and Medicaid-Only Individuals, FYs 2004-2006

	Dual Eligibles				Medicaid-Only			
	Users		Costs		Users		Costs	
	Number	Percent of Total	Dollars	Percent of Total	Number	Percent of Total	Dollars	Percent of Total
FY 2004	1,600	71.8%	\$70,419,558	65.4%	628	28.2%	\$37,273,683	34.6%
FY 2005	1,609	72.9%	\$73,050,782	66.0%	597	27.1%	\$37,625,273	34.0%
FY 2006	1475	72.2%	\$71,526,382	65.4%	567	27.8%	\$37,844,918	34.6%

Per capita Medicaid spending for dual eligibles is less than per capita spending for Medicaid-only beneficiaries (Table 16). In FY 2006, the average cost per user for Medicaid-only beneficiaries was 38 percent higher than for dual eligibles (\$66,746 for Medicaid-only compared to \$48,492 for dual eligibles). While annual increases in the average cost per user for both groups have been modest, ranging from 3 percent to 7 percent, the highest cost per user increased dramatically from FY 2004 to FY 2006—49 percent for the dual eligibles (from \$226,850 to \$338,520), and 89 percent for Medicaid-only individuals (from \$223,285 to \$423,006). As shown in the discussion and charts that follow, inpatient hospitalizations are a major factor in the costs for high-cost individuals in the study population.

Table 16. Average and Highest Medicaid Costs Per User for Dual Eligibles and Medicaid-Only Individuals, FYs 2004-2006

	Dual Eligibles		Medicaid-Only	
	Average Cost/User	Highest Cost/User	Average Cost/User	Highest Cost/User
FY 2004	\$44,012	\$226,850	\$59,353	\$223,285
FY 2005	\$45,401	\$229,213	\$63,024	\$337,394
FY 2006	\$48,492	\$338,520	\$66,746	\$423,006

In FY 2006, 55 percent of dual eligibles (812 individuals) resided in a nursing facility for more than 300 days (i.e., 11-12 months). These “long-stay” dual eligibles accounted for 75 percent of total Medicaid costs for dual eligibles (i.e., \$53.7 million of the \$71.5 million total) (Table 17). Among Medicaid-only beneficiaries, 45 percent (258 individuals) were in a nursing facility for more than 300 days and accounted for 69 percent of Medicaid costs for this group (i.e., \$26.1 million of the \$37.8 million total). The average cost per user for these long-stay Medicaid-only beneficiaries (\$101,064) was 53 percent higher than for the dual eligibles (\$66,190).

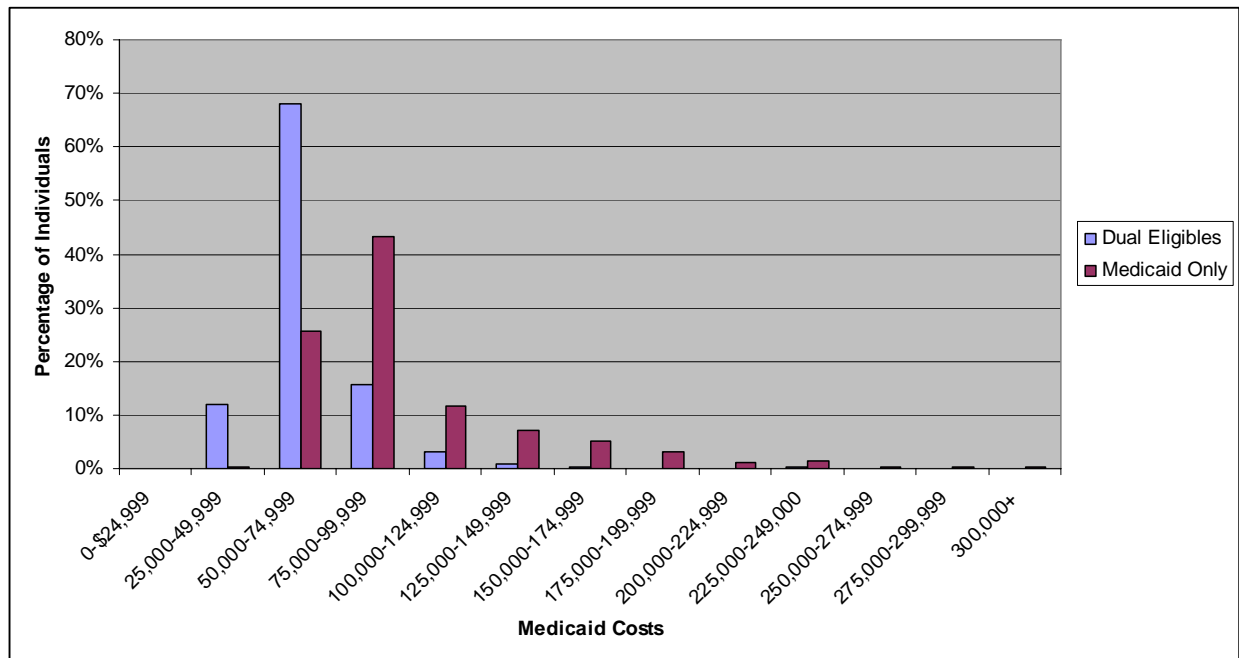


Table 17. Medicaid Costs for Dual Eligibles and Medicaid-Only Individuals by Number of Days in a Nursing Facility, FY 2006

Days in Nursing Facility	Dual Eligibles		Medicaid-Only		Total	
	Users	Total Costs	Users	Total Costs	Users	Total Costs
0-60	179	\$1,033,695	119	\$1,618,979	298	\$2,652,674
61-120	114	\$1,978,632	76	\$2,513,075	190	\$4,491,707
121-180	131	\$3,682,409	61	\$3,370,530	192	\$7,052,939
181-240	106	\$4,280,380	27	\$2,067,015	133	\$6,347,395
241-300	133	\$6,804,858	26	\$2,200,885	159	\$9,005,743
301-366	812	\$53,746,408	258	\$26,074,434	1,070	\$79,820,842
Total	1,475	\$71,526,382	567	\$37,844,918	2,042	\$109,371,299

As Table 17 shows, 1,070 individuals (or 52 percent of the study populations) resided in a nursing facility for more than 300 days in FY 2006. Figure 1 compares costs for dual eligibles versus non-dual eligibles in this group. Cost ranges in \$25,000 increments are displayed on the x-axis (i.e., \$0-\$24,999, \$25,000-\$49,999, etc.). The y-axis represents the percentage of individuals in a particular cost range. For example, 68 percent of dual eligibles had costs in the \$50,000-\$74,999 range, compared to 26 percent of Medicaid-only beneficiaries. The bar graphs show that dual eligibles have a lower average cost and are more tightly grouped around that average than the Medicaid-only group, where a larger percentage has costs that exceed \$100,000 per year.

Figure 1. Medicaid Costs for Individuals Residing in a Nursing Facility for 300 Days or More: Dual Eligibles versus Medicaid-Only Individuals, FY 2006



Long-Stay Nursing Facility Residents

Table 18 shows average per capita Medicaid costs by service category for individuals (dual eligibles and non-dual eligibles) who resided in a nursing facility for more than 300 days (i.e., 11 months or longer) in FY 2006. As total costs per individual increase, the proportion of expenditures for nursing facility care declines while the proportion of expenditures for inpatient hospitalizations increases. For those with nursing facility costs in excess of \$150,000, inpatient hospitalizations averaged \$43,800 and accounted for 22 percent of costs, whereas nursing facility costs were only 60 percent of the total. There is also a significant increase in “other” expenses (i.e., dental, home health, outpatient, non-psychotropic pharmacy, physician, and special program services). Figure 2 illustrates this shift.

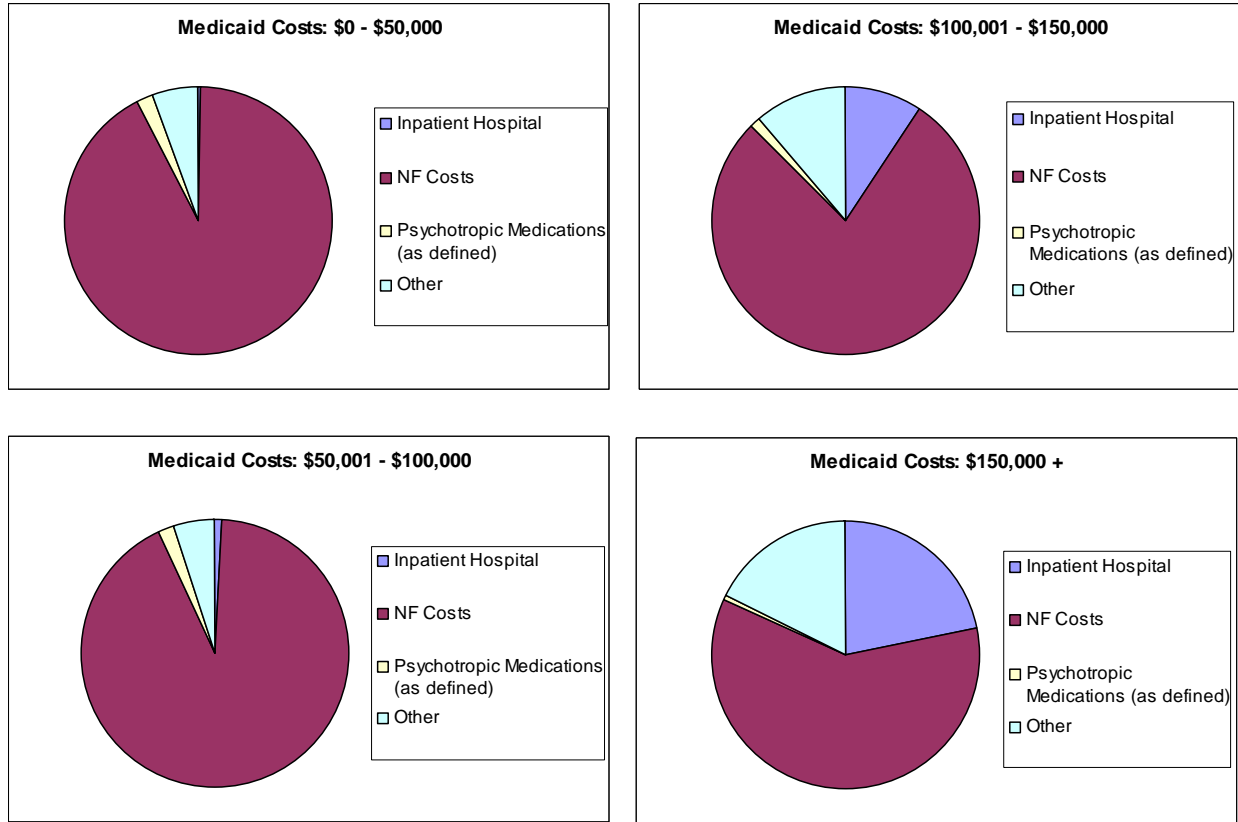
Table 18. Average Per Capita Medicaid Costs by Service Category for Individuals Residing in a Nursing Facility for 300 Days or More, FY 2006

Service	\$0 - \$50,000		\$50,001 - \$100,000		\$100,001 - \$150,000		\$150,001 +	
	n = 98		n = 856		n = 79		n = 37	
	Average Per Capita	% of Total	Average Per Capita	% of Total	Average Per Capita	% of Total	Average Per Capita	% of Total
Emergency Department Visits	\$17.31	<1%	\$31.80	<1%	\$196.26	<1%	\$537.67	<1%
Inpatient Hospital	\$166.68	<1%	\$645.92	1%	\$11,159.48	9%	\$43,800.52	22%
Nursing Facility	\$41,072.36	92%	\$63064.23	92%	\$92,931.71	78%	\$119,632.82	60%
Mental Health	\$0	0%	\$19.28	<1%	\$16.33	<1%	\$115.57	<1%
Occupational, Physical & Speech Therapies	\$68.30	<1%	\$77.73	<1%	\$41.06	<1%	\$23.39	<1%
Durable Medical Equipment	\$0	0%	\$5.01	<1%	\$32.06	<1%	\$39.38	<1%
Psychotropic Medications	\$890.51	2%	\$1,347.01	2%	\$1,955.71	2%	\$1,489.46	1%
Other*	\$2,431.74	5%	\$3,266.62	5%	\$12,792.37	11%	\$34,823.26	17%
Total	\$44,646.90	100%	\$68,477.61	100%	\$119,124.97	100%	\$200,462.08	100%

* Includes dental, home health, outpatient, non-psychotropic pharmacy, physician, and special program services.



Figure 2. Average Per Capita Medicaid Costs by Service Category for Individuals Residing in a Nursing Facility for 300 Days or More, FY 2006*



*Costs for emergency department visits; mental health; occupational, physical, and speech therapies; and durable medical equipment are so minimal that they are combined with the “Other” category.

Psychotropic Medications

Costs for psychotropic medications used by the study population totaled \$1.9 million in FY 2006. As shown in Tables 19, 20, and 21, utilization of psychotropic medications and medication costs were similar across the three diagnosis groups. The most commonly used classes of psychotropic medications were antidepressants, antipsychotics, benzodiazepines, and miscellaneous anticonvulsants. In FY 2006, antipsychotics accounted for 42.5 percent of total psychotropic medication costs; miscellaneous anticonvulsants accounted for 32.7 percent; and antidepressants accounted for 18.4 percent.

While Tables 19, 20, and 21 display total Medicaid costs for each medication class, comparing costs from one fiscal year to the next must be done with caution. With the introduction of Medicare Part D on January 1, 2006, many of the psychotropic medications prescribed to dual eligibles in the study population were covered by Medicare during the second half of FY 2006.

Tables 22, 23, and 24 show the most frequently occurring combinations of psychotropic medication classes by diagnosis group. The “top three” pairs of medications for each of the three diagnosis groups included:



- Antidepressants and antipsychotics
- Antipsychotics and benzodiazepines
- Benzodiazepines and miscellaneous anticonvulsants

Table 19. TBI-Only: Medicaid Costs by Psychotropic Medication Class, FYs 2004-2006

FY 2004						
Psychotropic Medication Class	Total Users	Total Scripts	Avg. No. Scripts per User	Avg. Days Supply per User	Total Costs	% of Total Costs
Antidepressants	888	9,504	11	278	\$469,686	22%
Antimanic	16	124	8	208	\$1,503	<1%
Antipsychotics	630	7,234	11	291	\$1,004,628	47%
Barbiturates	90	1,211	13	263	\$9,609	<1%
Benzodiazepines	467	3,536	8	127	\$44,352	2%
Miscellaneous anticonvulsants	581	7,365	13	306	\$547,247	26%
Sedatives	235	1,218	5	118	\$45,395	2%
Stimulants	46	590	13	212	\$8,436	<1%
Total		30,782			\$2,130,854	100%
FY 2005						
Psychotropic Medication Class	Total Users	Total Scripts	Avg. No. Scripts per User	Avg. Days Supply per User	Total Costs	% of Total Costs
Antidepressants	863	9,764	11	299	\$445,015	20%
Antimanic	20	198	10	258	\$2,265	<1%
Antipsychotics	612	7,523	12	309	\$1,028,128	46%
Barbiturates	70	1,036	15	287	\$8,148	<1%
Benzodiazepines	488	4,039	8	130	\$46,864	2%
Miscellaneous anticonvulsants	579	8,046	14	335	\$638,295	29%
Sedatives	218	1,338	6	130	\$49,441	2%
Stimulants	40	388	10	198	\$6,814	<1%
Total		32,332			\$2,224,971	100%
FY 2006						
Psychotropic Medication Class	Total Users	Total Scripts	Avg. No. Scripts per User	Avg. Days Supply per User	Total Costs	% of Total Costs
Antidepressants	784	6,745	9	224	\$281,047	19%
Antimanic	18	174	10	258	\$1,421	<1%
Antipsychotics	519	5,019	10	241	\$646,334	43%
Barbiturates	61	848	14	272	\$5,758	<1%
Benzodiazepines	502	4,293	9	128	\$41,237	3%
Miscellaneous anticonvulsants	575	5,861	10	253	\$491,897	33%
Sedatives	180	875	5	98	\$32,047	2%
Stimulants	31	225	7	141	\$6,908	<1%
Total		24,040			\$1,506,649	100%

* “Miscellaneous stimulants” and “psychotherapeutic” medication classes (see Exhibit3) did not yield any users.

** “Total Users” is an unduplicated count within each medication class but a duplicated count across medication classes.



Table 20. Anoxia-Only: Medicaid Costs by Psychotropic Medication Class, FYs 2004-2006

FY 2004						
Psychotropic Medication Class	Total Users	Total Scripts	Avg. No. Scripts per User	Avg. Days Supply per User	Total Costs	% of Total Costs
Antidepressants	145	1,494	10	259	\$75,763	22%
Antimanic	5	46	9	264	\$910	<1%
Antipsychotics	103	1,034	10	237	\$151,540	43%
Barbiturates	12	205	17	303	\$1,957	1%
Benzodiazepines	100	944	9	135	\$12,105	3%
Miscellaneous anticonvulsants	109	1,388	13	288	\$96,508	28%
Sedatives	34	185	5	105	\$8,866	3%
Stimulants	4	139	35	546	\$1,435	<1%
Total		5,435			\$349,084	100%
FY 2005						
Psychotropic Medication Class	Total Users	Total Scripts	Avg. No. Scripts per User	Avg. Days Supply per User	Total Costs	% of Total Costs
Antidepressants	136	1,590	12	301	\$73,548	21%
Antimanic	4	44	11	282	\$971	<1%
Antipsychotics	99	1,091	11	261	\$150,063	43%
Barbiturates	11	146	13	281	\$1,110	<1%
Benzodiazepines	95	907	10	155	\$10,143	3%
Miscellaneous anticonvulsants	105	1,494	14	307	\$96,420	28%
Sedatives	36	278	8	151	\$11,101	3%
Stimulants	8	129	16	271	\$1,759	1%
Total		5,679			\$345,115	100%
FY 2006						
Psychotropic Medication Class	Total Users	Total Scripts	Avg. No. Scripts per User	Avg. Days Supply per User	Total Costs	% of Total Costs
Antidepressants	109	945	4	223	\$43,017	21%
Antimanic	5	49	10	223	\$908	<1%
Antipsychotics	81	614	8	184	\$75,002	37%
Barbiturates	16	168	11	232	\$1,242	1%
Benzodiazepines	96	874	9	156	\$6,725	3%
Miscellaneous anticonvulsants	95	1,007	11	236	\$63,977	32%
Sedatives	31	180	6	122	\$9,840	5%
Stimulants	5	21	4	118	\$684	<1%
Total		3,858			\$201,396	100%

* “Miscellaneous stimulants” and “psychotherapeutic” medication classes (see Exhibit3) did not yield any users.
 ** “Total Users” is an unduplicated count within each medication class but a duplicated count across medication classes.



Table 21. TBI and Anoxia: Medicaid Costs by Psychotropic Medication Class, FYs 2004-2006

FY 2004						
Psychotropic Medication Class	Total Users	Total Scripts	Avg. No. Scripts per User	Avg. Days Supply per User	Total Costs	% of Total Costs
Antidepressants	59	681	12	288	\$32,700	15%
Antimanic	2	14	7	151	\$199	<1%
Antipsychotics	52	555	11	280	\$94,246	43%
Barbiturates	15	245	16	252	\$2,490	1%
Benzodiazepines	49	548	11	157	\$11,796	5%
Miscellaneous anticonvulsants	62	939	15	344	\$71,649	33%
Sedatives	22	135	6	148	\$5,708	3%
Stimulants	9	78	9	151	\$954	<1%
Total		3,195			\$219,741	100%
FY 2005						
Psychotropic Medication Class	Total Users	Total Scripts	Avg. No. Scripts per User	Avg. Days Supply per User	Total Costs	% of Total Costs
Antidepressants	72	818	11	275	\$31,091	12%
Antimanic	1	4	4	110	\$30	<1%
Antipsychotics	62	895	14	337	\$130,293	49%
Barbiturates	13	205	16	268	\$2,330	1%
Benzodiazepines	66	731	11	142	\$10,812	4%
Miscellaneous anticonvulsants	73	1080	15	325	\$82,072	31%
Sedatives	21	101	5	120	\$4,397	2%
Stimulants	10	96	10	185	\$3,035	1%
Total		3,930			\$264,059	100%
FY 2006						
Psychotropic Medication Class	Total Users	Total Scripts	Avg. No. Scripts per User	Avg. Days Supply per User	Total Costs	% of Total Costs
Antidepressants	56	673	12	303	\$24,834	13%
Antimanic	0	0	0	0	\$0	<1%
Antipsychotics	48	567	12	286	\$86,470	45%
Barbiturates	13	167	13	156	\$1,451	1%
Benzodiazepines	55	555	10	148	\$4,876	3%
Miscellaneous anticonvulsants	68	936	14	298	\$65,579	34%
Sedatives	14	84	6	138	\$3,755	2%
Stimulants	9	76	8	176	\$3,477	2%
Total		3,058			\$190,442	100%

* “Miscellaneous stimulants” and “psychotherapeutic” medication classes (see Exhibit3) did not yield any users.

** “Total Users” is an unduplicated count within each medication class but a duplicated count across medication classes.



Table 22. TBI-Only: Most Frequently Occurring Drug Combinations, FYs 2004-2006

Combination of Psychotropic Medication Classes	FY 2004		FY 2005		FY 2006	
	Total Users*	Rank	Total Users	Rank	Total Users	Rank
Antidepressants and Antipsychotics	407	1	395	1	334	1
Antipsychotics and Benzodiazepines	252	2	269	2	247	2
Benzodiazepines and Miscellaneous Anticonvulsants	232	3	232	3	230	3
Antipsychotics and Miscellaneous Anticonvulsants	133	4	145	4	125	4
Antidepressants and Benzodiazepines	110	5	121	5	121	5
Antidepressants and Miscellaneous Anticonvulsants	102	7	90	7	103	6
Miscellaneous Anticonvulsants and Sedatives	110	5	104	6	96	7
Benzodiazepines and Sedatives	50	8	57	8	42	8
Barbiturates and Benzodiazepines	32	9	22	11	25	9
Antipsychotics and Barbiturates	30	10	29	9	20	10
Antidepressants and Barbiturates	25	14	19	13	17	11
Antidepressants and Sedatives	29	11	23	10	17	11
Antimanic and Antipsychotics	13	16	17	14	15	13
Barbiturates and Miscellaneous Anticonvulsants	26	12	22	11	15	13
Antidepressants and Antimanic	12	17	15	15	14	15
Miscellaneous Anticonvulsants and Stimulants	20	15	10	18	14	15
Antipsychotics and Sedatives	26	12	15	15	12	17
Benzodiazepines and Stimulants	3	20	6	19	5	18
Sedatives and Stimulants	2	21	5	20	4	19
Antidepressants and Stimulants	12	17	11	17	3	20
Antimanic and Benzodiazepines	0	24	2	21	2	21
Antimanic and Miscellaneous Anticonvulsants	2	21	1	23	1	22
Barbiturates and Sedatives	2	21	1	23	1	22
Antipsychotics and Stimulants	5	19	2	21	0	24

* "Total Users" is an unduplicated count within each medication pair but a duplicated count across medication pairs.



Table 23. Anoxia-Only: Most Frequently Occurring Drug Combinations, FYs 2004-2006

Combination of Psychotropic Medication Classes	FY 2004		FY 2005		FY 2006	
	Total Users*	Rank	Total Users	Rank	Total Users	Rank
Antidepressants and Antipsychotics	65	1	56	1	45	1
Benzodiazepines and Miscellaneous Anticonvulsants	42	3	38	3	35	2
Antipsychotics and Benzodiazepines	46	2	48	2	33	3
Antidepressants and Benzodiazepines	26	4	20	4	23	4
Antipsychotics and Miscellaneous Anticonvulsants	22	5	20	4	22	5
Antidepressants and Miscellaneous Anticonvulsants	15	6	14	7	13	6
Miscellaneous Anticonvulsants and Sedatives	14	7	15	6	13	6
Benzodiazepines and Sedatives	10	8	12	8	12	8
Barbiturates and Benzodiazepines	6	9	2	15	5	9
Antidepressants and Antimanic	3	12	3	11	4	10
Antimanic and Antipsychotics	4	11	3	11	4	10
Antidepressants and Sedatives	5	10	5	9	3	12
Barbiturates and Miscellaneous Anticonvulsants	2	14	3	11	3	12
Antipsychotics and Barbiturates	3	12	3	11	2	14
Miscellaneous Anticonvulsants and Stimulants	2	14	1	17	2	14
Antidepressants and Barbiturates	0	20	0	20	1	16
Antidepressants and Stimulants	1	16	4	10	1	16
Antimanic and Benzodiazepines	1	16	1	17	1	16
Antipsychotics and Sedatives	1	16	2	15	1	16
Antipsychotics and Stimulants	0	20	1	17	1	16
Barbiturates and Sedatives	1	16	0	20	0	20

* "Total Users" is an unduplicated count within each medication pair but a duplicated count across medication pairs.



Table 24. TBI and Anoxia: Most Frequently Occurring Drug Combinations, FYs 2004-2006

Combination of Psychotropic Medication Classes	FY 2004		FY 2005		FY 2006	
	Total Users*	Rank	Total Users	Rank	Total Users	Rank
Benzodiazepines and Miscellaneous Anticonvulsants	30	1	45	1	45	1
Antidepressants and Antipsychotics	28	2	41	2	41	2
Antipsychotics and Benzodiazepines	27	3	40	1	40	3
Miscellaneous Anticonvulsants and Sedatives	14	4	14	4	14	4
Antidepressants and Benzodiazepines	5	10	11	5	11	5
Antidepressants and Miscellaneous Anticonvulsants	6	8	7	6	7	6
Antipsychotics and Barbiturates	7	6	7	6	7	6
Antipsychotics and Miscellaneous Anticonvulsants	10	5	7	6	7	6
Barbiturates and Benzodiazepines	7	6	7	6	7	6
Barbiturates and Miscellaneous Anticonvulsants	6	8	5	10	5	10
Benzodiazepines and Sedatives	5	10	3	11	3	11
Miscellaneous Anticonvulsants and Stimulants	2	12	3	11	3	11
Antidepressants and Stimulants	2	12	2	13	2	13
Antidepressants and Barbiturates	1	17	1	14	1	14
Antimanic and Antipsychotics	2	12	1	14	1	14
Antipsychotics and Sedatives	0	19	1	14	1	14
Antipsychotics and Stimulants	0	19	1	14	1	14
Benzodiazepines and Stimulants	1	17	1	14	1	14
Sedatives and Stimulants	0	19	1	14	1	14
Antidepressants and Antimanic	2	12	0	20	0	20
Antidepressants and Sedatives	2	12	0	20	0	20

* "Total Users" is an unduplicated count within each medication pair but a duplicated count across medication pairs.



Conclusion

This study examined nursing facility service utilization and costs for individuals with a diagnosis of traumatic brain injury (TBI), anoxia, or both TBI and anoxia who resided in a nursing facility at some time during FYs 2004-2006. The “TBI-Only” and “TBI and Anoxia” diagnosis groups appeared to be driving the utilization and cost increases observed in the study population. Overall, the number of individuals in the study population declined by 8.3 percent from FY 2004 to FY 2006, but costs increased by 1.6 percent. Dual eligibles comprised about three-quarters of the study population but only accounted for about two-thirds of Medicaid costs because a portion of the care for this population is covered by Medicare. Individuals with long stays in nursing facilities consume proportionately more services; for example, 52 percent of the study population resided in a nursing facility for 300 days or longer in FY 2006 and were responsible for 73 percent of costs. For Maryland’s MFP demonstration to succeed in transitioning persons with brain injury from institutional settings to the community, it will be important to ensure that appropriate community-based mental health services, occupational/physical/speech therapies, and durable medical equipment are available to this population. In addition, because psychotropic medication utilization is significant among this population, medication use must be carefully managed and monitored.





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