



Frequent Outpatient Emergency Department Use by New Hampshire Medicaid Members

*An Evaluation of Prevalence, Diagnoses, Utilization, and
Payments*

A report prepared for the
New Hampshire Department of Health and Human Services
By the
Maine Health Information Center

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About the New Hampshire Comprehensive Health Care Information System

The New Hampshire Comprehensive Health Care Information System (NH CHIS) is a joint project between the New Hampshire Department of Health and Human Services and the New Hampshire Insurance Department. The NH CHIS was created by state statute (RSA 420-G:11-a) to make health care data “available as a resource for insurers, employers, providers, purchasers of health care, and state agencies to continuously review health care utilization, expenditures, and performance in New Hampshire and to enhance the ability of New Hampshire consumers and employers to make informed and cost-effective health care choices.” For more information about the NH CHIS, please visit <http://www.nh.gov/nhchis> or www.nhchis.org.

About the Study

This study was conducted by the Maine Health Information Center (MHIC) under a contract with the State of New Hampshire Department of Health and Human Services, Office of Medicaid Business and Policy, titled New Hampshire Comprehensive Health Care Information System. The views expressed are those of the authors and do not necessarily represent the views of the MHIC, or the New Hampshire DHHS. For more information contact Karl Finison, Director of Research, Maine Health Information Center, 207-430-0632, kfinison@mhic.org.

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EXECUTIVE SUMMARY

This study evaluated frequent outpatient emergency department (ED) use by New Hampshire (NH) Medicaid members during CY2006. A frequent ED user was defined as a member with four or more outpatient ED visits during the year. Prevalence by age, eligibility group, and geographical area of residence (Health Analysis Areas) were evaluated. The impact on utilization and payments and the clinical diagnoses associated with outpatient ED visits were also evaluated. This study was based on NH Medicaid administrative eligibility and claims data for calendar (CY) 2006.*

Key Findings:

Prevalence

- Among the 106,068 average covered NH Medicaid members, 42,723 (40%) were identified through the administrative claims data as having at least one outpatient ED visit during the year and 5,757 (5%) were frequent ED users.
- The highest number of frequent ED users (1,836) was in the low income child eligibility group. However, higher prevalence rates of frequent ED use were found in adult low income (11%), disabled physical (11%), and disabled mental (13%) eligibility groups compared to the low income child (5%) eligibility group.

Impact on Utilization and Payments

- While the 5,757 frequent ED users represented only 5 percent of the Medicaid population, they incurred 37,105 (41%) of the 91,392 total Medicaid outpatient ED visits during CY2006, resulting in \$7.8 million in payments.
- Frequent ED users also had higher rates of office-clinic visits and higher rates of ED visits resulting in an inpatient hospitalization compared to all other Medicaid members.

Trends in Outpatient ED Use

- The total number of outpatient ED visits increased by 4,492, from 86,900 in CY2005 to 91,392 in CY2006. Between CY2005 and CY2006, the outpatient ED use rate increased by 4.2 percent, from 827 per 1,000 members to 862 per 1,000 members.
- The number and prevalence of Medicaid frequent ED users increased slightly from 5,418 (5.2%) to 5,757 (5.4%) between CY2005 and CY2006.

* This study was based on CHIS reports for Medicaid members created between March 7, 2008 and April 15, 2008. Due to database changes, numbers reported here may not match numbers in reports created before or after these dates.

Frequent ED Users and Member Cost Distribution

- While most Medicaid frequent ED users were not very high cost members (annual payments were less than \$15,000), frequent ED users were more likely to be higher cost than all other Medicaid members.

Frequent ED User Access to Primary Care Practitioners

- Standardized for age differences, Medicaid-only frequent ED users had higher rates of accessing primary care (91.5%) compared to other Medicaid members (82.7%). Access to primary care includes both preventive visits and visits made for treatment.
- Standardized for age differences, Medicaid-only frequent ED users had the same rate of preventive visits with primary care practitioners as all other Medicaid members (52.7%).

Outpatient ED Use by Clinical Diagnostic Categories

- Low income child frequent ED users incurred 9,601 outpatient ED visits. Other upper respiratory infections (1,163), otitis media (967), superficial injury, contusion (602), sprains and strains (379), and viral infections (343) were leading causes.
- Low income adult frequent ED users incurred 10,619 outpatient ED visits, and disorders of teeth and jaw (1,283) was the leading subcategory. Sprains and strains, abdominal pain, headache, back problems, and complications of pregnancy were other leading causes. Headache, abdominal pain, back problems, sprains and strains, and disorders of the teeth and jaw were also leading categories among the disabled physical and disabled mental.
- Outpatient ED visits related to dental problems had higher prevalence in frequent ED users compared with all other Medicaid members, resulting in \$205,485 in payments. Outpatient ED visits related to headaches and lower back problems were also more prevalent in frequent ED users compared with all other Medicaid members.
- A subset of specific conditions with higher likelihood of being non-urgent or treatable in the primary care setting rather than the hospital ED were studied. During CY2006, among the 5,757 frequent ED users, 4,220 (about 3 in 4) had at least one visit for these conditions. In total, these conditions accounted for 10,826 (29%) of the total 37,105 outpatient ED visits and \$2.1 million in payments.

Frequent ED User Length of Time to Second Visit

- Among the 5,757 frequent ED users the average time between the first and second outpatient ED visit was 50 days.
- The cause of the second ED visit was in the same diagnostic group for 1,061 (18%) of the frequent ED user second visits.

Frequent ED User Use by Day of Week

- While frequent ED users use the ED more than all other members do, the pattern of outpatient ED use by day of week was not significantly different between frequent ED users and all other members.

Frequent ED User Prevalence by Federal Poverty Level (FPL)

- Among 67,566 average members with less than 100% FPL, 4,624 (6.8%) were frequent ED users. Among 38,502 average members with 100% or higher FPL, 1,133 (2.9%) were frequent ED users.
- Adjusted for age and other factors, Medicaid members with lower adjusted income (<100% FPL) were twice as likely to be frequent ED users compared with other Medicaid members.
- Adjusted for age, poverty level, and other factors Medicaid members with a preventive visit in an office or clinic setting were 29 percent less likely to be a frequent ED user compared with other Medicaid members.

Prevalence of Frequent ED Users by Geographical Area

- Standardized for age differences, the highest CY2006 rates of ED visit per 1,000 members were in the following Health Analysis Areas (HAA): Franklin (1,310 per 1,000 members), Laconia (1,286), Dover (1,165), Lancaster (1,108), Rochester (1,033), Berlin (1,017), and Claremont (990). These seven HAAs were also the seven highest ED rate areas in the NH CHIS CY2005 study.¹
- The age-standardized prevalence rate of frequent ED users was highest in Franklin (9.4%), Laconia (9.3%), Dover (8.8%), Lancaster (8.2%), Rochester (7.0%), Berlin (6.6%), and Claremont (6.6%), and lowest in Woodsville (2.1%), Peterborough (2.5%), Keene (2.8%), Lebanon (3.8%), Manchester (4.3%), North Conway (4.4%), and Exeter (4.4%).

Limitations: This study is based primarily on administrative claims data. Administrative claims data is collected primarily for the purpose of making financial payments. Specific provider, diagnosis, and procedure coding are typically required as part of the financial payment process. The use of claims data is an efficient and less costly method to report on health care utilization and payments than other methods such as surveys or patient chart audits. Administrative claims data may under-report some diagnostic conditions or services; however, some studies indicate that administrative claims data may provide a more accurate rate than medical chart review.

This was a descriptive study of the demographics, utilization, and ED payments associated with frequent ED users. Although comparisons were made to all other Medicaid members, the study did not measure the underlying disease status of frequent ED users compared to all other Medicaid members.

Conclusion and Next Steps: Frequent ED users were prevalent in NH Medicaid and contribute to a large proportion of total outpatient ED use. All eligibility groups contributed but rates were higher among adults covered by NH Medicaid. A significant amount of frequent outpatient ED use was associated with conditions for which the primary care office or clinic setting is a more appropriate source of care. While most frequent ED users did visit a primary care practitioner during the year, rates of visits specifically identified as preventive were low among adults. Increased prevention and improved wellness may reduce frequent ED use. There would have been \$2.1 million in savings if each frequent ED user had just one less outpatient ED visit during the year. Further statistical modeling of factors associated with frequent ED use may identify which factors are most important in reducing use. Incorporating an illness risk grouper in a future analysis would be useful.

INTRODUCTION

This report was developed to evaluate frequent outpatient emergency department (ED) use by New Hampshire (NH) Medicaid members. The study used NH Medicaid administrative eligibility and claims data to identify members with frequent ED use.

A previous study by the NH CHIS project published in 2007 compared outpatient ED use rates among members enrolled in NH Medicaid with members enrolled in NH CHIS commercial plans.¹ The results of that study indicated that NH Medicaid members had an outpatient ED visit rate that was 4.4 times higher than CHIS commercial. The results also indicated that 17 percent of NH Medicaid members had repeat (more than one) hospital outpatient ED visits compared to only 3 percent of CHIS commercial members. Repeat ED users with more than one visit in the year accounted for 73 percent of all NH Medicaid ED use.

A recent study of repeat ED users that used a statewide database in Utah found that 33 percent of patients accounted for 62 percent of all ED visits.² That study identified a repeat ED user as any person with 4 or more ED visits during the year. For this NH CHIS study of NH Medicaid the same definition (4 or more ED visits) was adopted to identify frequent ED users.

Numerous studies have linked rates of ED use to access to primary care. One study by the NYU Center for Health and Public Service Research reported 41.3 percent of ED use was for conditions that did not require treatment within the next 12 hours and 33.5 percent of ED use was for conditions that did not require hospital services and could be treated in the primary care setting.³ National data indicate that children covered by Medicaid are slightly less likely to have a usual source of care compared with children covered by commercial private insurance (5.0% vs. 2.4% with no usual source of care).⁴

National data indicate that 10 percent of adults between the ages of 18 and 64 covered by Medicaid do not have a usual source of care. Furthermore, adults covered by Medicaid were 4 times more likely to indicate that the ED was their usual source of care compared with adults covered by commercial private insurance (4.0% vs. 0.9%), and poverty has been associated with increased likelihood of identifying the ED as a usual source of care.^{5,6}

Using the NH Medicaid administrative claims data, this study identified and evaluated frequent outpatient ED users during CY2006 and compared them with other members enrolled in Medicaid. The information was stratified by eligibility groups, age, gender, geographical area of residence, and clinical diagnosis. Rates of access to primary care and preventive visits with primary care practitioners for frequent ED users were compared with other members enrolled in Medicaid. This study, developed by the Maine Health Information Center and the New Hampshire Department of Health and Human Services, represents the first detailed evaluation of frequent ED use in the Medicaid program by the NH CHIS project.

Overview and Purpose of Report

The purpose of this study was to describe the prevalence of frequent outpatient ED use in the NH population covered by Medicaid. The scope of the study was to evaluate:

- prevalence of frequent ED users;
- impact of frequent ED users on utilization and payments;
- trend in prevalence of frequent ED users;
- relationship between access to primary care practitioners, preventive visits and frequent ED use;
- frequent ED use by clinical diagnostic grouping;
- lag time between first and second ED visit for frequent ED users;
- day of week of visit;
- members' percent of federal poverty level (FPL);
- age-specific and age-standardized rates;
- Medicare Dual Eligible and Medicaid-only status;
- Medicaid eligibility group (e.g. low income or disabled); and
- outpatient ED use and frequent ED user prevalence by geographical location (Health Analysis Area) of member residence.

Data Sources and Methods

This study was based on New Hampshire Medicaid administrative eligibility and claims data for CY2006 (based on date of service). A frequent ED user was defined as any NH Medicaid member with four or more outpatient ED visits during the year. Payments, office-clinic visits, and ED visits resulting in inpatient hospitalization were also evaluated. Frequent ED users were compared to all other Medicaid members.

If populations are not similar due to differing age distributions or other differences, direct comparison of the overall (crude) rates may be misleading. To prevent this, standardization is used in this report to compare total rates. Standardization of rates for age differences were made in the comparisons of the Medicaid frequent ED population to all other Medicaid members and for geographical comparisons. The indirect method of age standardization was used as it is the preferred method for standardization of rates for geographical analysis of small areas such as the Health Analysis Areas used in this study.

The clinical causes of outpatient ED, office-clinic, and ED resulting in inpatient hospitalization were assigned using the ICD-9-CM (International Classification of Diseases, Ninth Revision) diagnosis on the administrative claims. Emergency department visits were aggregated into clinically meaningful groupings using the Clinical Classification Software (CCS)

for ICD-9-CM from the Agency for Healthcare Research and Quality (AHRQ). This was the first NH CHIS study to use the CCS grouping.

Methods used in this study are described in detail in Appendix 1 at the end of the report.

Population Studied in the Report

The CY2006 experience of members covered by NH Medicaid was studied. Consistent with other reporting for NH Medicaid, the study excluded from the NH Medicaid population members with limited or no Medicaid benefits (e.g., Medicare buy-in programs) and children covered under the SCHIP.

The primary focus was on the utilization associated with frequent ED users. These members were also compared to all other members covered by Medicaid during the year.

NH CHIS commercial population was not compared in this study. A prior NH CHIS study indicated that repeat ED use was rare in the CHIS commercial population.¹

Interpretation of Results and Limitations

This is the first detailed study of frequent ED use for the NH Medicaid program. The large number of covered members studied in this one-year sample lends credibility to the findings. However, a number of cautions about the data used and results of this study are provided.

This study was based on administrative eligibility and claims data. Variances in provider or insurer claims coding, data processing, or reimbursement arrangements may contribute to the variances shown in this report.

This study focused on NH Medicaid, which is a diverse population with multiple eligibility groups. In addition to low income children and adults, Medicaid programs typically cover a large population of persons with chronic disease and disability. Persons institutionalized for long periods of time in nursing and other facilities are also common in Medicaid. Methods used to control for these differences included:

- separate reporting of Medicare Dual Eligible and Medicaid-only members;
- separate reporting of disabled and other Medicaid eligibility groups;
- use of age-specific prevalence rates; and
- use of age-standardized utilization and payment rates.

Because the CHIS data does not include claims paid by Medicare, payments for Dual Eligible Medicaid members are incomplete.

Additional details about the study methods and limitations are provided in Appendix 1.

RESULTS

Frequent Outpatient ED Users – Prevalence

For this NH CHIS study, a frequent ED user was defined as any member with four or more outpatient ED visits during the year. The CY2006 prevalence rates of frequent ED users are summarized by Medicaid eligibility group in Table 1.

Among the 106,068 average covered NH Medicaid members, 42,723 (40%) were identified through the administrative claims data as having at least one outpatient ED visit during the year and 5,757 (5%) were frequent ED users. For 17,884 average Dual Eligible covered members, 1,475 (8%) were frequent ED users and for 88,184 average Medicaid-only covered members 4,282 (5%) were frequent ED users.

The highest number of frequent ED users (1,836) was in the low income child eligibility group. However, higher prevalence rates of frequent ED users were found in adult low income (11%), disabled physical (11%), and disabled mental (13%) eligibility groups compared to the low income child (5%) eligibility group. Prevalence of frequent ED users was also relatively low in the elderly (4%).

Table 1. Prevalence Rate (Number of Members) Outpatient ED Users. NH Medicaid CY2006.

Eligibility Group	Medicaid Total	Medicare Dual Eligible	Medicaid-only
Any Outpatient ED User			
Total Medicaid	40% (42,723)	44% (7,890)	40% (34,833)
Low Income Child	35% (22,746)	69% (2)	35% (22,744)
Low Income Adult	61% (8,497)	66% (560)	60% (7,937)
Severely Disabled Child	20% (243)	0% (0)	20% (243)
Disabled Physical	51% (3,631)	53% (1,876)	49% (1,755)
Disabled Mental	50% (4,259)	48% (2,339)	53% (1,920)
Elderly	36% (3,347)	36% (3,113)	34% (234)
Frequent Outpatient ED Users*			
Total Medicaid	5% (5,757)	8% (1,475)	5% (4,282)
Low Income Child	3% (1,836)	0% (0)	3% (1,836)
Low Income Adult	11% (1,600)	15% (124)	11% (1,476)
Severely Disabled Child	1% (17)	0% (0)	1% (17)
Disabled Physical	11% (802)	12% (423)	11% (379)
Disabled Mental	13% (1,132)	12% (588)	15% (544)
Elderly	4% (370)	4% (340)	4% (30)

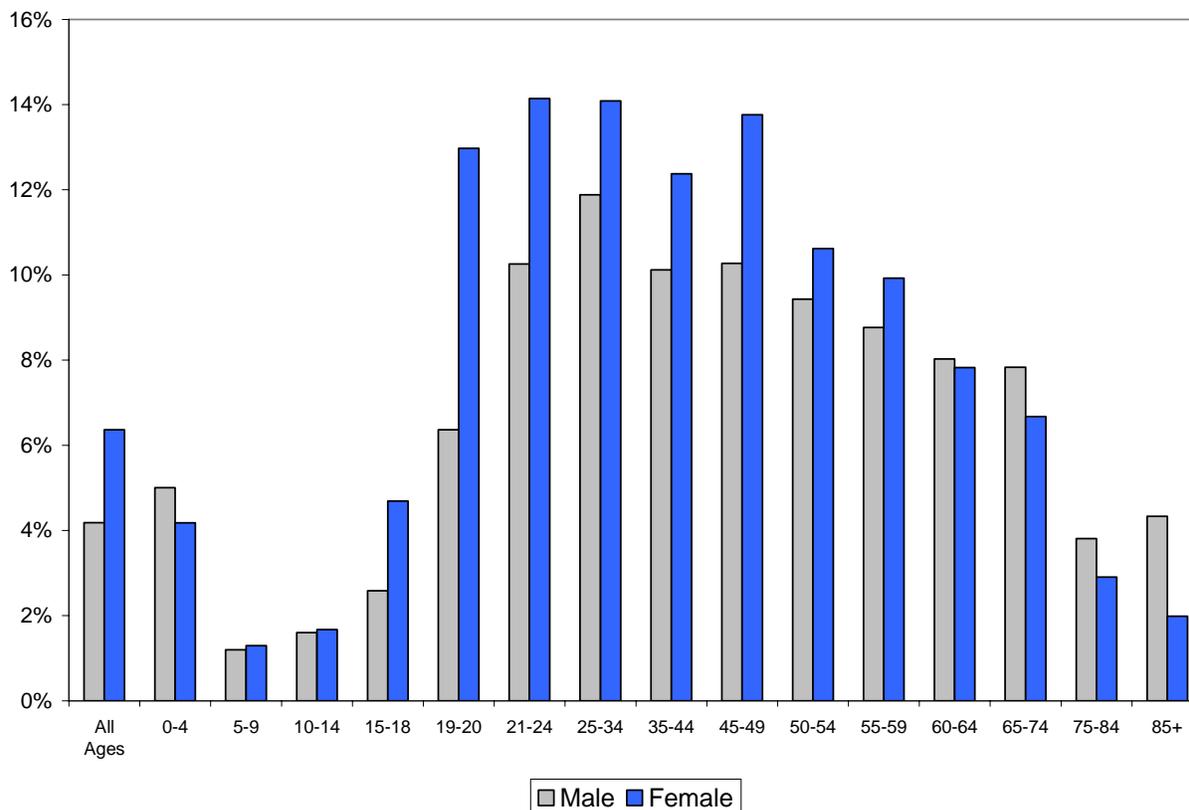
* Frequent ED users are members with 4 or more outpatient ED visits during the year.

Figure 1 provides comparative frequent ED user prevalence rates by age and gender for members enrolled in NH Medicaid. Prevalence of frequent ED users was lowest among children and the elderly and highest for adults between 19-49 years of age. While adults age 19-49 represented 23,213 (22%) of the average members covered by Medicaid, they represented 2,943 (51%) of the frequent ED users. The highest rate by age was among Medi-

caid members 25-34 years of age and this age group had the highest volume of frequent ED users (1,067).

Overall females had a frequent ED user prevalence rate (6%) that was 52 percent higher than males (4%). Teen females age 15-18 and adult females 19-49 years of age contributed to this difference.

Figure 1. Prevalence of Frequent ED Users by Age and Gender. NH Medicaid, CY2006.



Frequent ED Users – Impact on Utilization and Payments

Member’s outpatient ED utilization and payment measures are summarized in Table 2. Office-clinic visits use and ED use resulting in inpatient hospitalization were also evaluated.

While the 5,757 frequent ED users represented only 5 percent of the Medicaid population, they incurred 41 percent of the total Medicaid outpatient ED visits during CY2006. Within Medicaid-only members the 4,282 frequent ED users accounted for 37 percent of the total Medicaid-only outpatient ED visits. Within Dual Eligible members the 1,475 frequent ED users accounted for 52 percent of the total Dual Eligible outpatient ED visits. Medicaid-only frequent ED user outpatient ED use resulted in \$6.6 million (38%) of the total outpatient ED payments for Medicaid-only members. Dual frequent ED user outpatient ED use

resulted in \$1.2 million (48%) of the total outpatient ED Medicaid payments for Dual members.

Table 2. Utilization and Payments for Frequent ED Users and All Other Members. NH Medicaid, CY2006.

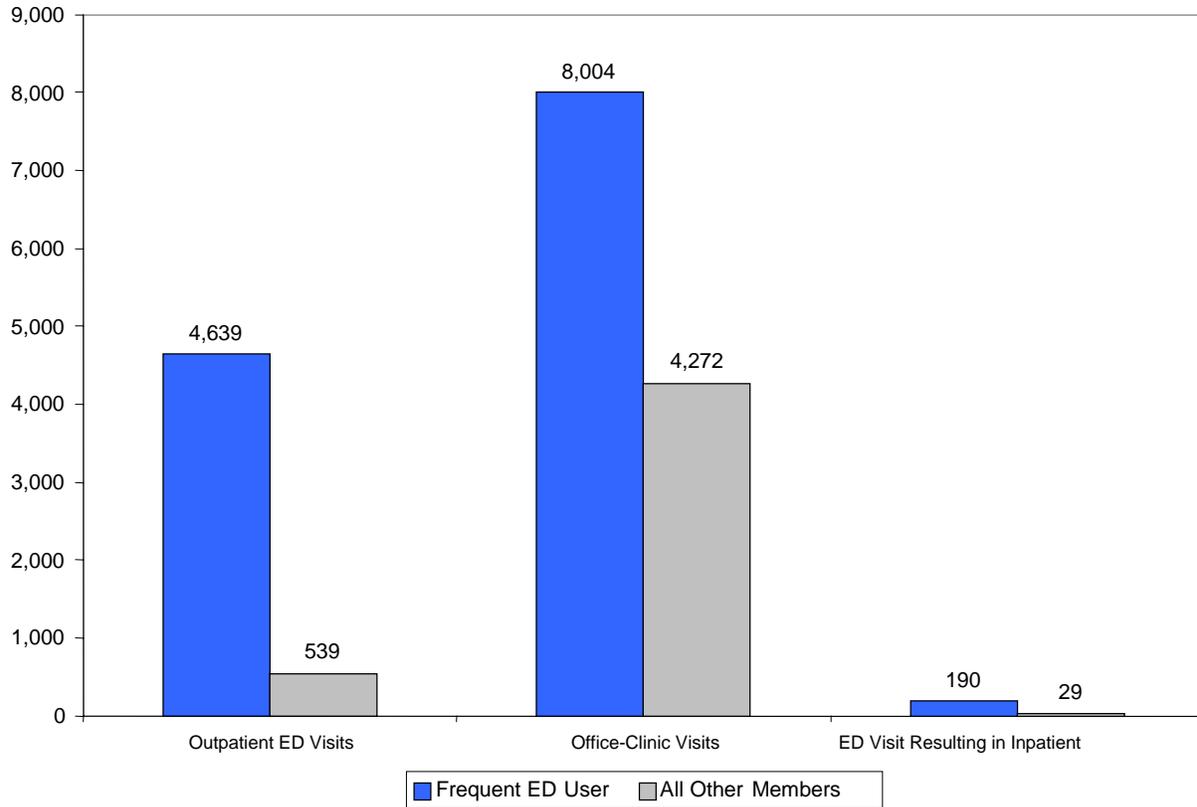
Measure	Dual Eligible		Medicaid-only	
	Frequent ED Users	All Other Members	Frequent ED Users	All Other Members
Outpatient ED Visits (exclusive of ED Visits Resulting in Inpatient Hospitalization)	10,597	9,797	26,508	44,490
Payments (millions)	\$1.2*	\$1.3*	\$6.6	\$10.7
Average Paid	\$114*	\$135*	\$248	\$241
ED Visits Resulting in Inpatient Hospitalization	762	2,118	1,392	2,333
Average Paid	\$1,339*	\$1,082*	\$3,260	\$4,139
Office/Clinic Visits	16,814	81,110	40,077	355,348
Average Paid	\$35*	\$32*	\$85	\$82
Statistical Rates**				
Outpatient ED Visits per 1,000 Members	7,764	593	6,665	528
Office/Clinic Visits per 1,000 Members	12,319	4,910	10,077	4,220
ED Visits Resulting in Inpatient Hospitalization per 1,000 Members	558	128	350	28

*Payment information for Dual Eligible members is incomplete because Medicare administrative claims are not part of the NH CHIS database. **Statistical rates in Table 2 are not standardized for population age differences; age-standardized rates for Medicaid-only are provided in Figure 2.

In addition to the outpatient ED use rate, frequent ED users also had higher rates of office-clinic visits and higher rates of ED visits resulting in an inpatient hospitalization compared to all other Medicaid members. These differences were found in both the Dual Eligible and the Medicaid-only eligibility groups.

Age-standardized utilization rates for Medicaid-only members were compared between the frequent ED user group and all other members and are displayed in Figure 2. The age-standardized rate of outpatient ED visits for frequent ED users (4,639 per 1,000) was 8.6 times the rate for all other members (539 per 1,000). The age-standardized rate of office-clinic visits for frequent ED users (8,004 per 1,000) was 1.9 times the rate for all other members (4,272 per 1,000). The age-standardized rate of ED visit resulting in inpatient hospitalization for frequent ED users (190 per 1,000) was 6.6 times the rate for all other members (29 per 1,000). These differences indicate that frequent ED users also used other services at higher rates than other members.

Figure 2. Utilization Rates Comparing Frequent ED Users to All Other Members. Age-Standardized Rates of Utilization per 1,000 Members. NH Medicaid-only, CY2006.



The proportion of total payments attributed to frequent ED users' outpatient ED use was also determined. All Medicaid members incurred \$834 million in payments during CY2006. The 5,757 frequent ED users incurred \$74.9 million in total payments of which \$7.8 million (10%) was attributed to their outpatient ED use.

Medicaid-only members incurred \$434.8 million in total payments during CY2006. The 4,282 Medicaid-only frequent ED users incurred \$50.9 million in total payments and \$6.6 million (13%) was attributed to their outpatient ED use.

Trends in Outpatient ED Use and Prevalence of Frequent ED Users

The total number of outpatient ED visits increased by 4,492, from 86,900 in CY2005 to 91,392 in CY2006. Low income children, low income adults, and disabled mental eligibility groups contributed to the greatest increase in outpatient ED volume, but all eligibility groups had increased rates.

Between CY2005 and CY2006, the outpatient ED use rate increased by 4.2 percent from 827 per 1,000 members to 862 per 1,000 members. Outpatient ED visits and the prevalence of frequent ED users are reported in Table 3.

The number and prevalence of Medicaid frequent ED users increased from 5,418 (5.2%) to 5,757 (5.4%) between CY2005 and CY2006. The prevalence rate increased in all eligibility groups, but low income children accounted for most of the increase in the number of frequent ED users.

The trend in outpatient ED visit rate (4.2%) was greater than the trend in office-clinic visit rate (2.7%) between CY2005 and CY2006.

Table 3. Trend in Outpatient ED Use and Prevalence of Frequent ED Users. NH Medicaid CY2006.

Eligibility Group	2005 Outpatient ED Visits	2006 Outpatient ED Visits	2005-2006 ED Visit Rate Trend (2006 Rate per 1,000 Members)	2005 Frequent ED User Prevalence (Number of Members)	2006 Frequent ED User Prevalence (Number of Members)
Total Medicaid	86,900	91,392	4.2% (862)	5.2% (5,418)	5.4% (5,757)
Low Income Child	36,820	39,111	4.1% (593)	2.6% (1,656)	2.8% (1,836)
Low Income Adult	20,337	21,300	3.6% (1,520)	11.4% (1,580)	11.4% (1,600)
Severely Disabled Child	347	418	** (344)	1.4% (16)	1.4% (17)
Disabled Physical	10,032	10,154	4.6% (1,421)	10.4% (765)	11.2% (802)
Disabled Mental	12,998	13,900	5.7% (1,630)	12.7% (1,068)	13.3% (1,132)
Elderly	6,366	6,509	6.4% (702)	3.5% (333)	4.0% (370)

* Frequent ED users are members with 4 or more visits. ** Trend not reported due to small numbers.

Frequent ED Users and Member Cost Distribution

The total payments (all claims) for each member during the year were determined and members were assigned to annual payment categories (\$0-\$14,999, \$15,000-\$49,999, \$50,000-\$99,999, \$100,000-\$249,999, and over \$249,999). Results are summarized in Table 4.

While most (4,395) frequent ED users were grouped in the \$0-14,999 annual payment category, frequent ED users were more likely than other members to be in a higher annual payment category than other members. Overall, 1,362 (24%) of the 5,757 frequent ED users incurred total payments \$15,000 or greater during CY2006. By contrast, only 13,389 (10%) of all other members incurred total payments \$15,000 or greater during CY2006.

Table 4. Annual Payment Category Distribution (Number of Members). NH Medicaid CY2006.

Member's Annual Payment Category	Frequent ED Users	All Other Members
Medicaid Total		
Total	100.0% (5,757)	100.0% (131,524)
\$0 - \$14,999	76.3% (4,395)	89.8% (118,135)
\$15,000 - \$49,999	19.0% (1,093)	8.1% (10,650)
\$50,000 - \$99,999	3.5% (201)	1.6% (2,128)
\$100,000 - \$249,999	1.1% (66)	0.5% (605)
Over \$249,999	0.0% (2)	0.0% (6)
Medicaid-Only Members		
Total	100.0% (4,282)	100.0% (110,687)
\$0 - \$14,999	79.2% (3,392)	95.1% (105,221)
\$15,000 - \$49,999	16.7% (716)	3.8% (4,234)
\$50,000 - \$99,999	3.1% (133)	0.8% (929)
\$100,000 - \$249,999	0.9% (40)	0.3% (297)
Over \$249,999	0.0% (1)	0.0% (6)
Dual Members		
Total	100.0% (1,475)	100.0% (20,822)
\$0 - \$14,999	68.0% (1,003)	61.9% (12,899)
\$15,000 - \$49,999	25.6% (377)	30.8% (6,416)
\$50,000 - \$99,999	4.6% (68)	5.8% (1,199)
\$100,000 - \$249,999	1.8% (26)	1.5% (308)
Over \$249,999	0.0% (1)	0.0% (0)

While most Medicaid frequent ED users were not the highest cost members (annual payments were less than \$15,000), frequent ED users were more likely to incur higher costs than all other Medicaid members.

Frequent ED User Access to Primary Care Practitioners

Lack of access to primary care may be a factor in ED use. For this study the rate of member access to primary care practitioners and the rate of members with any preventive visit with primary care practitioners were evaluated and results are reported in Figure 3 and Table 5. This evaluation was restricted to Medicaid-only members with continuous enrollment during CY2006. Restricting analysis of access to primary care practitioners and preventive visits to members with continuous enrollment is consistent with NCQA HEDIS methods. Among Medicaid-only, 3,471 (81%) of frequent ED users and 61,990 (56%) of all other members were continuously enrolled and used in this analysis.

Figure 3. Access to Primary Care Practitioner and Preventive Visits. Age-standardized rates. NH Medicaid-only, CY2006.

Standardized for age differences, Medicaid-only frequent ED users had higher rates of accessing primary care (91.5%) compared to other Medicaid members (82.7%). Access to primary care includes both preventive visits and visits made for illness.

The crude preventive visit rate (44.6%) for frequent ED users was lower than all other members (53.2%). However, standardized for age differences, Medicaid-only frequent ED users had the same rate of preventive visits with primary care practitioners as all other Medicaid members (52.7%). The difference between the crude and age-standardized results from the higher prevalence of adults among frequent ED users and the lower rate of preventive visit among Medicaid adults compared to children.

These results indicate that frequent ED users did not have a significant problem with access to primary care practitioners or preventive visits compared to other Medicaid members. However, visits identified specifically as preventive were very low for adults.

Table 5. Access to Primary Care and Preventive Visit Rates, Outpatient ED Users. NH Medicaid-only Members, CY2006.

Eligibility Group**	Frequent ED Users	All Other Members
Percent of Members who Accessed Primary Care (95% CI)		
Total Medicaid	93.1% (92.3-94.0)	82.6% (82.3-82.9)
Low Income Child	93.0% (91.7-94.3)	83.2% (82.8-83.5)
Low Income Adult	92.7% (91.1-94.4)	84.3% (83.4-85.2)
Disabled Physical	95.2% (92.7-97.7)	84.1% (82.7-85.5)
Disabled Mental	92.9% (90.6-95.3)	77.4% (75.8-79.0)
Age-standardized total rate	91.5% (88.4-94.7)	82.7% (82.0-83.4)
Percent of Members with a Preventive Visit (95% CI)		
Total Medicaid	44.6% (43.0-46.3)	53.2% (52.8-53.5)
Low Income Child	66.9% (64.6-69.2)	60.2% (59.8-60.6)
Low Income Adult	25.1% (22.4-27.8)	27.3% (26.2-28.4)
Disabled Physical	23.5% (18.7-28.3)	25.5% (25.2-30.6)
Disabled Mental	29.4% (25.3-33.5)	31.0% (29.2-32.7)
Age-standardized total rate	52.7% (50.1-55.4)	52.7% (52.1-53.3)

* These rates, while based on NCQA HEDIS specifications, should not be compared with HEDIS rates of access to primary care or well child visits. HEDIS rates are age-specific and may track members over more than one year. Dual eligible members were not included in this table consistent with other NH CHIS reporting.

**There was insufficient sample size to compare frequent ED user rates for Medicaid-only severely disabled children (n=12) or elderly (n=29).

Outpatient ED Use by Clinical Diagnostic Group

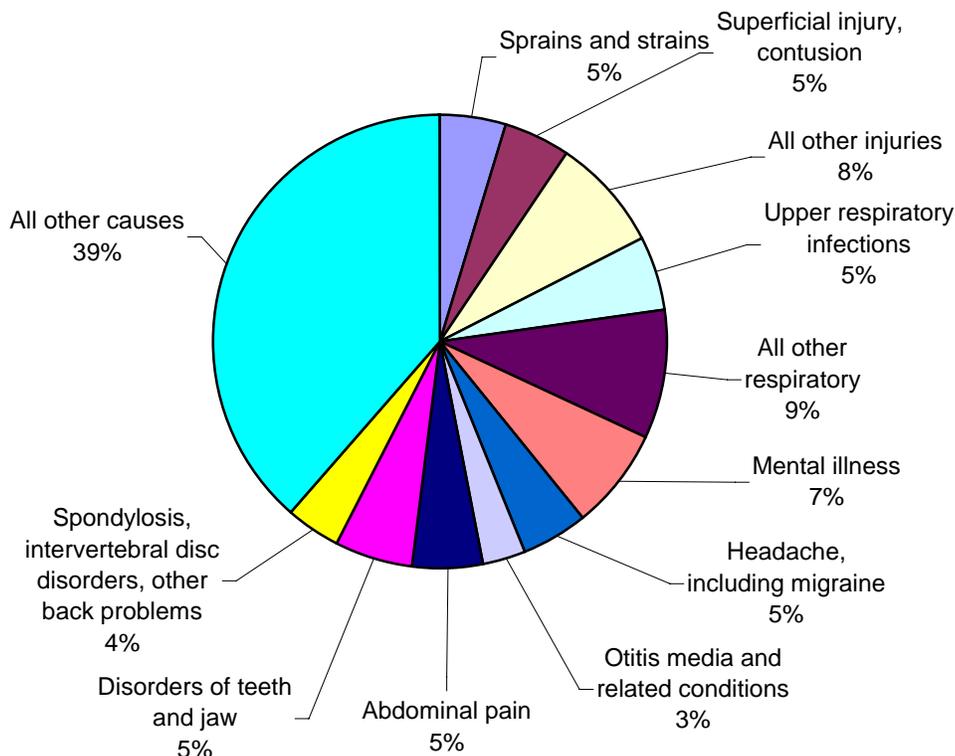
The causes of outpatient ED use were evaluated using the ICD-9-CM (International Classification of Diseases, Ninth Revision) diagnosis on the administrative claims.

Clinical Classification Software (CCS)

Using the diagnosis on the administrative claims, ED visits were aggregated into clinically meaningful groupings using the Clinical Classification Software (CCS) for ICD-9-CM from the Agency for Healthcare Research and Quality (AHRQ).⁷ This was the first NH CHIS study to utilize the CCS groupings. Leading major CCS categories and CCS subcategories that contributed to frequent ED user outpatient ED use summarized in Figure 4 and Table 6. Appendix 4 at the end of this report provides detail for all CCS categories.

Figure 4. Leading Causes of Frequent ED User Outpatient ED Use by Clinical Classification Software (CCS) Causes. NH Medicaid, CY2006.

Total Outpatient ED Visits = 37,105



The 5,757 Medicaid frequent ED users incurred 37,105 outpatient ED visits during CY2006. Injuries accounted for 6,490 (17%) of the ED visits, with Sprains and Strains (CCS 232-1,775 visits) and Superficial Injury, Contusions (CCS 239 1,751 visits) as leading sub-categories. Respiratory diseases accounted for 5,374 (14%) of the ED visits. Other Upper Respiratory Infections (CCS 126 1,966 visits), Other Lower Respiratory Infections (CCS 133 888 visits), and Asthma (CCS 128 628 visits) were leading sub-categories. Disease of the nervous system and sense organs accounted for 4,403 (12%) visits, with Headache (CCS 84) and Otitis Media (CCS 92) as leading subcategories. Symptoms and ill-defined conditions accounted for 4,215 (11%) of the ED visits, and abdominal pain and nausea and vomiting were leading contributors. Diseases of the digestive system accounted for 3,510 (9%) ED visits, and Disorders of the Teeth and Jaw (CCS 136 1,995 visits) accounted for more than half the ED visits in this disease category. Back problems, mental illness, urinary tract infections, nonspecific chest pain, skin diseases, complications of pregnancy, and infections and parasitic diseases were other leading contributors to frequent ED user outpatient ED use.

Table 6. Leading Causes of Frequent ED User Outpatient ED Use by Clinical Classification Software (CCS) Causes. NH Medicaid, CY2006.

Leading CCS Major Categories and Subcategories (in italics)	Description	Outpatient Emergency Department Visits	% of Total Outpatient ED Use for Frequent ED Users	Emergency Department Visits Resulting in Inpatient Hospitalization	Office-Clinic Visits
Total All Categories		37,105	100%	2,154	56,891
Injury and poisoning		6,490	17%	231	2,921
232	<i>Sprains and strains</i>	1,775	5%	4	685
239	<i>Superficial injury, contusion</i>	1,751	5%	4	460
236	<i>Open wounds of extremities</i>	505	1%	3	159
235	<i>Open wounds of head, neck, and trunk</i>	403	1%	2	112
Diseases of the respiratory system		5,374	14%	335	7,084
126	<i>Other upper respiratory infections</i>	1,966	5%	7	2,629
133	<i>Other lower respiratory disease</i>	888	2%	12	994
128	<i>Asthma</i>	628	2%	59	1,070
127	<i>Chronic obstructive pulmonary disease</i>	592	2%	73	803
125	<i>Acute bronchitis</i>	510	1%	21	526
Diseases of the nervous system and sense organs		4,403	12%	103	5,691
84	<i>Headache, including migraine</i>	1,720	5%	19	1,212
92	<i>Otitis media and related conditions</i>	1,159	3%	1	1,668
Symptoms; signs; and ill-defined conditions and factors influencing health status		4,215	11%	100	7,967
251	<i>Abdominal pain</i>	1,856	5%	60	1,569
250	<i>Nausea and vomiting</i>	606	2%	18	294
Diseases of the digestive system		3,510	9%	235	2,819
136	<i>Disorders of teeth and jaw</i>	1,995	5%	2	411
Diseases of the musculoskeletal system and connective tissue		2,812	8%	45	7,409
205	<i>Spondylosis, intervertebral disc disorders, other back problems</i>	1,488	4%	17	3,540
Mental illness		2,708	7%	412	4,756
Diseases of the genitourinary system		1,639	4%	114	2,936
159	<i>Urinary tract infections</i>	592	2%	50	504
Diseases of the circulatory system		1,603	4%	210	2,631
102	<i>Nonspecific chest pain</i>	1,045	3%	50	471
Diseases of the skin and subcutaneous tissue		1,216	3%	71	1,918
Complications of pregnancy; childbirth; and the puerperium		913	2%	33	2,481
Infectious and parasitic diseases		747	2%	37	1,684

Table 7 provides the top 10 CCS categories contributing to outpatient ED visits for frequent ED users by eligibility group. Low income child frequent ED users incurred 9,601 outpatient ED visits. Other Upper Respiratory Infections (1,163), Otitis Media (967), Superficial Injury, Contusion (602), Sprains and Strains (379), and Viral Infections (343) were leading contributors. Low income adult frequent ED users incurred 10,619 outpatient ED visits, and Disorders of Teeth and Jaw (1,283) was the leading subcategory. Sprains and strains, abdominal pain, headache, back problems, and complications of pregnancy were other leading causes. Headache, abdominal pain, back problems, sprains and strains, and disorders of the teeth and jaw were also leading categories among the disabled physical and disabled mental.

For each of these eligibility groups and CCS sub-categories, the frequent ED users also had higher rates of office-clinic visits than all other Medicaid members. For example, low income children who were frequent ED users had 1,163 outpatient ED visits for Upper Respiratory Infections (CCS 126). They also had 1,554 office-clinic visits for these conditions resulting in an office-clinic visit rate (291 per 1,000 members) that was 9 percent higher than the rate for these conditions among all other low income children (268 per 1,000 members).

Low income children who were frequent ED users had 967 outpatient ED visits for Otitis Media (CCS 92). They also had 1,443 office-clinic visits for these conditions resulting in an office-clinic visit rate (270 per 1,000 members) that was 54 percent higher than the rate for these conditions among all other low income children (176 per 1,000 members). This would suggest that frequent ED users may have higher incidence of these injuries and illness than other Medicaid members. Regardless, the conditions identified as contributors to frequent ED users are conditions that can often be treated in an office or clinic setting.

Table 7. Top 10 Leading Clinical Classification Software (CCS) Causes of Outpatient ED Use for Frequent ED Users by Clinical Classification by Eligibility Group. NH Medicaid, CY2006.

Leading CCS	Outpatient Emergency Department Visits	Leading CCS	Outpatient Emergency Department Visits
Low Income Child		Disabled Physical	
Total ED Visits	9,601 (100%)	Total ED Visits	5,740 (100%)
Other upper respiratory infections (CCS 126)	1,163 (12%)	Spondylosis, intervertebral disc disorders, other back (CCS 205)	332 (6%)
Otitis media and related conditions (CCS 92)	967 (10%)	Abdominal pain (CCS 251)	298 (5%)
Superficial injury, contusion (CCS 239)	602 (6%)	Headache, migraine (CCS 84)	282 (5%)
Sprains and strains (CCS 232)	379 (4%)	Nonspecific chest pain (CCS 102)	279 (5%)
Viral infections (CCS 7)	343 (4%)	Superficial injury, contusion (CCS 239)	238 (4%)
Fever of unknown origin (CCS 246)	339 (4%)	Sprains and strains (CCS 232)	217 (4%)
Abdominal pain (CCS 251)	301 (3%)	Disorders of teeth and jaw (CCS 136)	186 (3%)
Other injuries and conditions due to external causes (CCS 244)	273 (3%)	Other lower respiratory disease (CCS 133)	180 (3%)
Acute bronchitis (CCS 125)	216 (2%)	COPD and bronchiectasis (CCS 127)	165 (3%)
Nausea and vomiting (CCS 250)	213 (2%)	Skin and subcutaneous tissue infections (CCS 197)	165 (3%)
Low Income Adult		Disabled Mental	
Total ED Visits	10,619 (100%)	Total ED Visits	8,938 (100%)
Disorders of teeth and jaw (CCS 136)	1,283 (12%)	Headache, including migraine (CCS 84)	638 (7%)
Sprains and strains (CCS 232)	723 (7%)	Abdominal pain (CCS 251)	455 (5%)
Abdominal pain (CCS 251)	714 (7%)	Sprains and strains (CCS 232)	425 (5%)
Headache, including migraine (CCS 84)	666 (6%)	Spondylosis, intervertebral disc disorders, other back (CCS 205)	410 (5%)
Spondylosis, intervertebral disc disorders, other back (CCS 205)	630 (6%)	Disorders of teeth and jaw (CCS 136)	408 (5%)
Other complications of pregnancy (CCS 181)	501 (5%)	Superficial injury, contusion (CCS 239)	390 (4%)
Superficial injury, contusion (CCS 239)	450 (4%)	Other mental conditions (CCS 74)	381 (4%)
Other upper respiratory infections (CCS 126)	441 (4%)	Nonspecific chest pain (CCS 102)	368 (4%)
Skin and subcutaneous tissue infections (CCS 197)	234 (2%)	Anxiety, somatoform, dissociative, and personality disorders (CCS 72)	310 (3%)
Nonspecific chest pain (CCS 102)	218 (2%)	Affective disorders (CCS 69)	263 (3%)

*For the Elderly eligibility group (not shown in the table) the leading causes of the 2,123 outpatient ED visits were CCS 133 other lower respiratory disease, CCS 102 nonspecific chest pain, CCS 127 chronic obstructive pulmonary disease and bronchiectasis, and CCS 251 abdominal pain.

The prevalence of frequent ED users was higher among adult females age 19-64 enrolled in Medicaid compared with adult males age 19-64 enrolled in Medicaid (see Figure 1). To de-

termine whether outpatient ED use for conditions specific to adult females (e.g., complications of pregnancy) might contribute to this gender difference, the CCS categories were compared for adult females and adult males age 19-64. Results are reported in Table 8.

Rates of outpatient ED use were higher among female members age 18-64 compared to male members age 18-64. When pregnancy-related and other gender specific conditions are removed the differences are reduced. For all Medicaid members age 18-64 combined the outpatient ED visit rate was 10 percent higher in females compared to males after pregnancy and other gender-specific diseases are removed.

Table 8. Comparison of ED Visit Rates per 1,000 Members by Gender and ED Cohort for Members Age 19-64 by Clinical Classification Software (CCS) Causes. NH Medicaid, CY2006.

Clinical Classification Categories	Females Members		Male Members	
	Frequent ED Users	All Other Members	Frequent ED Users	All Other Members
Total All Causes	7,856	810	7,750	648
Total Excluding Gender Specific CCS	6,609	668	7,339	624
Gender Related Conditions				
Total gender specific	1,247	142	411	24
Pregnancy-related*	423	79	0	0
Other gender-related diseases**	119	15	57	4
Urinary tract infections (CCS 159)	147	22	67	8
Headache, including migraine (CCS 84)	558	25	287	11
Other Leading Clinical Classification Contributing to Differences				
Disorders of teeth and jaw (CCS 136)	628	51	435	31
Abdominal pain (CCS 251)	514	42	266	20
Spondylosis, intervertebral disc disorders, other back prob. (CCS 205)	410	28	469	25
Sprains and strains (CCS 232)	425	53	414	37
Superficial injury, contusion (CCS 239)	331	36	343	31
Other upper respiratory infections (CCS 126)	278	39	131	19

* CCS 174 – 196. **Other gender-related include gender-specific neoplasms, female pelvic and menstrual disorders and male genital disorders, CCS 24-31 and 164-173.

The leading CCS for adult females age 19-64 who were frequent ED users were Disorders of Teeth and Jaw (CCS 136 1,534 visits), Headache, Including Migraine (CCS 84 1,363 visits), abdominal pain (CCS 251 1,257 visits), Sprains and Strains (CCS 232 1,038 visits), Spondylosis, Intervertebral Disc Disorders, Other Back Problems (CCS 205 1,001 visits), Superficial Injury, Contusion (CCS 239 808 visits), other Upper Respiratory Infections (CCS 126 680 visits), and Other Complications of Pregnancy (CCS 181 581 visits). With the exception of the pregnancy CCS, these were the same leading CCS categories for adult males age 19-64. These results indicate that pregnancy-related outpatient ED visits were not a major factor in the higher prevalence of frequent ED user among adult females age 19-64.

Leading Causes of Outpatient ED Visits by Specific ICD-9-CM Discharge Diagnosis Code

Individual ICD-9-CM codes are the greatest level of clinical detail that can be reported using administrative claims data. Table 9 provides the top 15 specific ICD-9-CM principal discharge diagnoses from the administrative claims data. ICD-9-CM 382.9 Unspecified Otitis Media (1,032 visits), 525.9 Unspecified Disorder of the Teeth and Supporting Structures (968 visits), 465.9 Acute Upper Respiratory Infection, Unspecified Site (876 visits), 346.90 Migraine, Unspecified, Without Mention Of Intractable Migraine (870 visits), 784.0 headache (813 visits), and 724.2 Lumbago (692 visits) were the leading specific causes of outpatient ED use for frequent ED users.

Overall most of the ICD-9-CM for frequent ED users also ranked high for all other Medicaid members. Outpatient ED visits related to dental problems had higher prevalence in frequent ED users compared with all other Medicaid members. Outpatient ED visits related to headaches and lower back problems were also more prevalent in frequent ED users compared with all other Medicaid members.

Table 9. Top Causes of Outpatient ED Visit by ICD-9-CM Code. NH Medicaid, CY2006.

Frequent ED Users			All Other Medicaid Members		
ICD-9	Description	Outpatient ED Visits	ICD-9	Description	Outpatient ED Visits
382.9	Unspecified otitis media	1,032	382.9	Unspecified otitis media	2,399
525.9	Unspecified disorder of the teeth and supporting structures	968	465.9	Acute upper respiratory infection, unspecified site	1,833
465.9	Acute upper respiratory infection, unspecified site	876	780.6	Pyrexia, unknown origin	1,257
346.90	Migraine, unspecified, without mention of intractable migraine	870	462	Acute pharyngitis	1,139
784.0	Headache	813	079.99	Unspecified viral infection	790
724.2	Lumbago	692	920	Contusion of face, scalp, and neck	773
789.00	Abdominal pain, unspecified site	667	599.0	Urinary tract infection, site not specified	772
786.50	Unspecified chest pain	532	789.00	Abdominal pain, unspecified site	731
462	Acute pharyngitis	531	486	Pneumonia, organism unspecified	725
786.59	Other chest pain	499	845.00	Sprains and strains, ankle	703
599.0	Urinary tract infection, site not specified	487	466.0	Acute bronchitis	676
789.09	Abdominal pain, other specified site	472	525.9	Unspecified disorder of the teeth and supporting structures	672
311	Depressive disorder, not elsewhere classified	445	558.9	Other and unspecified noninfectious gastroenteritis and colitis	580
466.0	Acute bronchitis	422	784.0	Headache	532
780.6	Pyrexia, unknown origin	412	787.03	Vomiting alone	532

* Other leading causes for frequent ED users included 724.5 Unspecified Backache, 493.92 Unspecified Asthma With Acute Exacerbation, 847.2 Sprain Lumbar Region, 486 Pneumonia, Organism Unspecified, 521.00 Unspecified Dental Caries, 079.99 Unspecified Viral Infection, and 522.5 Periapical Abscess Without Sinus.

Selected Diagnoses Identified as Non-Urgent or Treatable in the Primary Care Setting

Many of the specific diagnoses reported above in Table 9 are potentially non-urgent or treatable in the primary care setting. The previous NH CHIS emergency department study that identified a subset of specific ICD-9 diagnostic categories as having a higher likelihood

for being non-urgent or treatable in the primary care setting rather than the hospital ED.¹ These included sore throat (strep), viral infection (unspecified), anxiety (unspecified or generalized), conjunctivitis (acute or unspecified), external and middle ear infections (acute or unspecified), upper respiratory infections (acute or unspecified), bronchitis (acute or unspecified) and cough, asthma, dermatitis and rash, joint pain, lower and unspecified back pain, muscle and soft tissue limb pain, fatigue, headache, and abdominal pain.

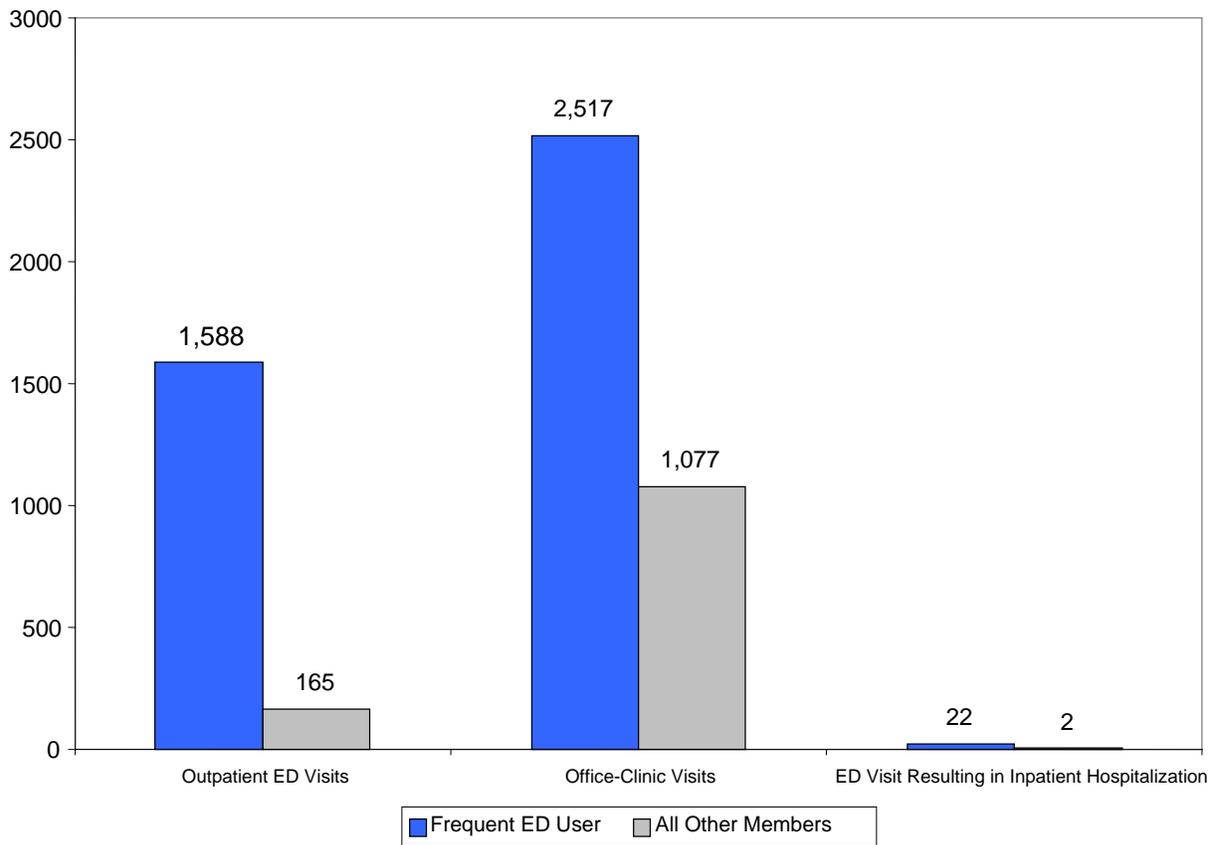
During CY2006, 17,159 NH Medicaid members used the outpatient ED for at least one of these conditions. The leading causes were external and middle ear infections (acute or unspecified), upper respiratory infections (acute or unspecified), bronchitis (acute or unspecified) and cough, and abdominal pain. This resulted in a total of 26,131 ED visits and \$4.9 million in payments. For these same conditions NH Medicaid members incurred 115,652 office-clinic visits. For these conditions the average payment per outpatient ED visit (\$187) was 3 times the average payment for an office-clinic visit (\$60). The number of members and total outpatient ED visits for these conditions increased over CY2005.

During CY2006, among the 5,757 frequent ED users, 4,220 (about 3 in 4) had at least one outpatient ED visit for these conditions. In total, these conditions accounted for 10,826 (29%) of the total 37,105 outpatient ED visits and \$2.1 million in payments.

Among 4,282 Medicaid-only frequent ED users, 3,308 (77%) had at least one outpatient ED visit for these selected conditions and there were a total of 8,409 outpatient ED visits for these conditions, representing \$1.8 million in payments. For Medicaid-only frequent ED users, these outpatient ED visits that have a high likelihood of being non-urgent or treatable in a primary care setting represented 8,409 (32%) of the 26,508 outpatient ED visits. For Medicaid-only members, Figure 5 gives age-standardized rates of outpatient ED, office-clinic, and ED visit resulting in inpatient hospitalization. For Medicaid-only frequent ED users the age standardized rate for outpatient ED use (1,588 per 1,000 members) was 10 times higher than the outpatient ED use rate for all other members, and the office-clinic use rate (2,517 per 1,000 members) was 2 times higher than the office-clinic use rate (1,027). ED visits resulting in inpatient hospitalization for these conditions were rare but higher for frequent ED users.

These results indicate that outpatient ED visits that have a high likelihood of being non-urgent or treatable in a primary care setting contributed significantly to frequent ED user ED use.

Figure 5. Selected Non-Urgent or Primary Care Treatable Diagnoses. Utilization Rates Comparing Frequent ED Users to All Other Members. Age-standardized rates of utilization per 1,000 members. NH Medicaid-only, CY2006.



Frequent ED User – Time to Second Visit

For frequent ED users the time in days between their first and second outpatient ED visits was evaluated. The CCS diagnostic categories were used to determine if the second outpatient ED visit was in the same CCS category as the first visit. This was used to estimate the degree to which the outpatient ED was being used frequently for the same medical conditions. The possibility of intervening office-clinic visits or ED visits resulting in inpatient hospitalizations between each outpatient ED visit was not evaluated in this study. Results are presented in Table 10.

Among the 5,757 frequent ED users the average time between the first and second outpatient ED visit was 50 days. The cause of the second ED visit was in the same diagnostic group for 1,061 (18%) of the frequent ED user second visits. When the cause of the second ED visit was in the same CCS group, the average days to second visit was shorter (30 days) compared to when the cause was a different CCS group (54 days). Overall, 22 percent of second ED visits occurred within a week of the first ED visit and this increased to 40 percent of second ED visits when the diagnosis was the same CCS category.

This analysis was replicated by eligibility group and by each CCS category. Compared with adult groups, low income children were less likely to have a second ED visit in the same CCS category and low income children had a time lag between first and second visits that averaged about 10 days longer than the adult eligibility groups.

These results indicate that in NH Medicaid frequent ED users will typically return to the outpatient ED within a relatively short period of time (over half within 2 months) for another outpatient ED visit. Furthermore, a significant proportion of NH Medicaid frequent repeat ED use is for the same clinical diagnostic category. Compared with children, adults were more likely to return to the ED sooner and for the same condition.

Table 10. Time to Second Outpatient ED Visit for Frequent ED Users. NH Medicaid, CY2006.

Frequent ED Users Time Lag to Second ED Visit	Second ED Visits	Second ED Visit in Same CCS as First ED Visit	Second ED Visit in Different CCS from First Visit
Average Time (days) to second visit	50	30	54
Time to Second ED Visit	100% (5,757)	100% (1,061)	100% (4,695)
0-7 days	22% (1,242)	40% (429)	17% (813)
8-14 days	10% (600)	11% (115)	10% (485)
15-30 days	17% (986)	17% (177)	17% (809)
31-60 days	20% (1,161)	16% (169)	21% (992)
61-90 days	13% (726)	8% (88)	14% (638)
91-180 days	15% (854)	7% (73)	17% (781)
181 or more days	3% (187)	1% (10)	4% (177)

Frequent ED User – Day of Week

The day of the week the outpatient ED visit took place was evaluated and results are summarized in Table 11.

If access to primary care practitioners and other specialists is lower on weekends compared with weekdays then higher ED use on weekends might be expected. Higher use rates might also occur during the nighttime but this cannot be evaluated from the claims data. The previous NH CHIS ED study (CY2005 data) did not identify a significant increase in outpatient ED use on weekends compared to weekdays in the Medicaid population.¹

For all Medicaid members the highest volume of outpatient ED visits occurred on Sunday (14,266) and Monday (13,812) and the lowest on Friday (12,188). The 5,757 frequent ED users incurred 37,105 outpatient ED visits and the highest volume of outpatient ED visits occurred on Monday (5,679) and Sunday (5,501) and the lowest on Friday (5,010). The proportion of visits by day of week did not vary significantly for frequent ED users. While frequent ED users use the ED more than all other members, the pattern of outpatient ED use by day of week was not significantly different between frequent ED users and all other members.

Table 11. Utilization and Payments for Frequent ED Users and All Other Members by Day of Week of Visit. NH Medicaid, CY2006.

Day of Week	Outpatient ED Visits	Percent of Outpatient ED Visits	Outpatient ED Payments	Average Paid	Office-Clinic Visits	Percent of Office-Clinic Visits
Frequent ED Users						
Totals	37,105	100.0%	\$7,791,711	\$210	56,891	100.0%
Monday	5,679	15.3%	\$1,205,133	\$212	10,992	19.3%
Tuesday	5,413	14.6%	\$1,147,202	\$212	11,712	20.6%
Wednesday	5,430	14.6%	\$1,175,764	\$217	11,080	19.5%
Thursday	5,100	13.7%	\$1,074,811	\$211	11,288	19.8%
Friday	5,010	13.5%	\$1,039,623	\$208	10,184	17.9%
Saturday	4,972	13.4%	\$1,020,019	\$205	991	1.7%
Sunday	5,501	14.8%	\$1,129,585	\$205	644	1.1%
All Other Members						
Totals	54,287	100.0%	\$12,056,359	\$222	436,458	100.0%
Monday	8,133	15.0%	\$1,812,141	\$223	86,477	19.8%
Tuesday	7,650	14.1%	\$1,680,003	\$220	91,412	20.9%
Wednesday	7,459	13.7%	\$1,725,905	\$231	87,323	20.0%
Thursday	7,515	13.8%	\$1,769,388	\$235	85,169	19.5%
Friday	7,178	13.2%	\$1,609,929	\$224	74,759	17.1%
Saturday	7,627	14.0%	\$1,613,860	\$212	7,742	1.8%
Sunday	8,725	16.1%	\$1,845,608	\$212	3,576	0.8%

There was little difference in average payment per outpatient ED visit by day of week. For frequent ED users average payment per visit was slightly lower on weekends compared with weekdays.

Office-clinic visit use was relatively low on weekends for both frequent ED users and all other members. While frequent ED users use both the outpatient ED and office-clinics at higher rates than all other members, no relative difference by day of week between frequent ED users and all other members was found.

Because time of visit was not available in the administrative claims data used for this study, a complete evaluation of the relationship between outpatient ED use and the possible availability of primary care and other providers in office-clinic setting was not possible in this study.

Frequent ED User - Prevalence by Federal Poverty Level

The prevalence of frequent ED users and use of outpatient ED, ED visits that resulted in an inpatient hospitalization, and office-clinic visits were tracked by the Federal Poverty Level (FPL) as reported in the NH Medicaid enrollment data. Results are reported in Table 12. Among 67,566 average members with less than 100% FPL, 4,624 (6.8%) were frequent ED users. Among 38,502 average members with 100% or higher FPL, 1,133 (2.9%) were frequent ED users.

Table 12. Frequent ED User Prevalence by Percent of Federal Poverty Level (FPL). NH Medicaid, CY2006.

Measure	Percent of Federal Poverty Level < 100%		Percent of Federal Poverty Level 100% or Higher	
	Frequent ED User	All Other Members	Frequent ED User	All Other Members
Outpatient ED Visits	30,574	37,687	6,531	16,600
Outpatient ED Payments (millions)	\$6.6	\$8.7	\$1.2	\$3.4
Office/Clinic Visits	46,204	295,963	10,687	140,495
ED Visits Resulting in Inpatient Hospitalization	1,790	3,030	364	1,421

* Federal Poverty Level (FPL) is determined at enrollment by adjusted income and not gross income of the household. An FPL of 100% would indicate that the member was living at the FPL after adjustments for income that can be disregarded in determination of eligibility for Medicaid and other programs.

To further evaluate the relationship between poverty level and frequent ED use, a multivariate (logistic regression) analysis was used. This was limited to Medicaid-only members with continuous enrollment during CY2006. Results are reported in Table 13.

Adjusted for age and other factors, Medicaid members with lower adjusted income (<100% FPL) were twice as likely to be frequent ED users compared with other Medicaid members. Adjusted for age, poverty level, and other factors Medicaid members with any preventive visit were 29 percent less likely to be a frequent ED user compared with other Medicaid members.

Table 13. Association Between Poverty Level, Other Indicators, and Likelihood of A Member Being a Frequent ED User. NH Medicaid, CY2006.

Measure	Adjusted Odds Ratios (95% CI)
Age	1.013 (1.010,1.015)
Female gender	1.574 (1.459,1.697)
Disabled eligibility status	1.553 (1.402,1.720)
Percent of FPL < 100%	2.051 (1.868,2.252)
Any access to primary care*	3.440 (2.989,3.960)
Any preventive visit	0.712 (0.659,0.769)

* Replacement of the access to primary care measure with total office-clinic visits in the model yielded similar results.

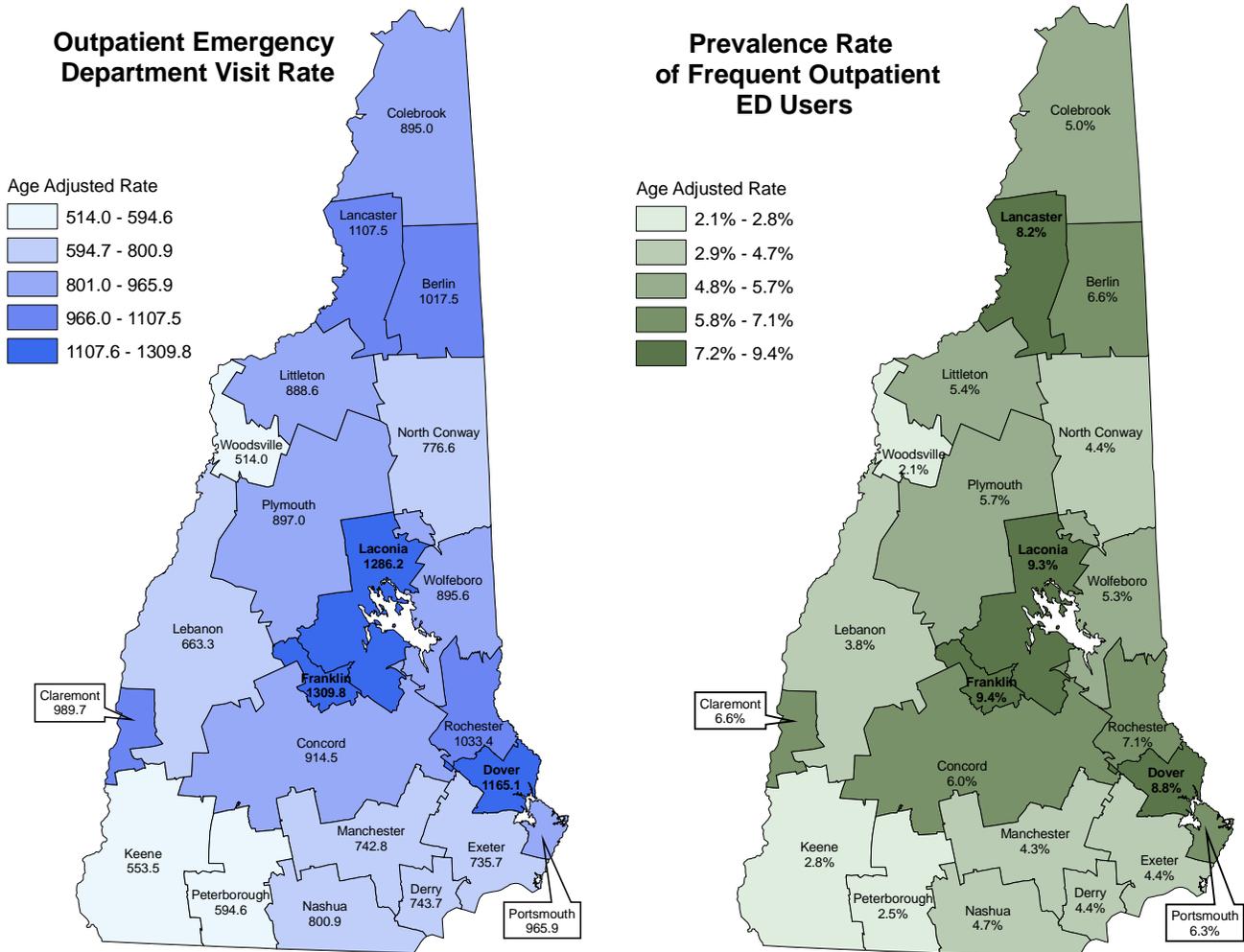
Prevalence of Frequent ED Users by Geographical Area

Evaluation of geographical variation in rates was based on the Health Analysis Area (HAA) of the Medicaid member's residence. Outpatient ED visit rates, frequent ED user prevalence, and access to primary care are reported in Figures 6 and Table 14. Rates were standardized for age differences in the HAA population.

Manchester (14,751), Nashua (10,429), and Concord (9,846), had the highest volume of outpatient ED visits during CY2006. Standardized for age differences, the highest CY2006

rates of ED visit per 1,000 members were in Franklin (1,310 per 1,000 members), Laconia (1,286), Dover (1,165), Lancaster (1,108), Rochester (1,033), Berlin (1,017), and Claremont (990). These seven HAA were also the seven highest ED rate areas in the NH CHIS CY2005 study.¹

Figure 6. Frequent ED Use Prevalence Rate. Outpatient Emergency Department Visit Rate. Age-standardized Rates of Utilization per 1,000 Members. NH Medicaid, CY2006.



The lowest rates of ED visit per 1,000 members were Woodsville (514 per 1,000 members), Keene (553), Peterborough (595), Lebanon (663), Exeter (736), Manchester (743), and Derry (744). These seven HAA were also the seven lowest ED rate areas in CY2005.¹ For both the CY2005 and CY2006 studies, southern NH areas had lower ED visit rates compared to northern NH areas.

Frequent ED users were the major driver of ED visit rates. The frequent ED user prevalence rate was strongly associated with higher overall ED visit rates. The age-standardized prevalence rate of frequent ED users was highest in Franklin (9.4%), Laconia (9.3%), Dover (8.8%), Lancaster (8.2%), Rochester (7.0%), Berlin (6.6%), and Claremont (6.6%) and lowest

in Woodsville (2.1%), Peterborough (2.5%), Keene (2.8%), Lebanon (3.8%), Manchester (4.3%), North Conway (4.4%), and Exeter (4.4%).

For a subset of the Medicaid-only members with continuous enrollment, the rate of members with any access to a primary care practitioner during CY2006 was determined by HAA. The age-standardized rate of members accessing a primary care practitioner was highest in Lancaster (100%), North Conway (99%), Lebanon (98%), Berlin (98%), Plymouth (97%), and Littleton (97%) and lowest in Franklin (82%), Laconia (89%), Portsmouth (91%), and Dover (91%).

Table 14. Outpatient Emergency Department Use Rates. NH Medicaid Members, CY2006.

Health Analysis Area	Total Outpatient Emergency Department Visits	Outpatient Emergency Department Visit Rate per 1,000 Members*	Number of Frequent ED Users	Frequent ED User Prevalence*	Percent of Members who Accessed Primary Care**	Percent of Members with Preventive Visit**
Total	91,392	862	5,757	5.4%	93%	45%
Berlin	2,523	1,017	168	6.6%	98%	40%
Claremont	2,947	990	202	6.6%	93%	43%
Colebrook	681	895	38	5.0%	**	**
Concord	9,846	914	650	6.0%	92%	43%
Derry	3,297	744	194	4.4%	93%	52%
Dover	6,060	1,165	463	8.8%	91%	44%
Exeter	4,281	736	251	4.4%	95%	41%
Franklin	3,095	1,310	221	9.4%	82%	33%
Keene	3,022	553	156	2.8%	95%	40%
Laconia	6,468	1,286	473	9.3%	89%	42%
Lancaster	1,302	1,108	95	8.2%	100%	42%
Lebanon	2,596	663	147	3.8%	98%	43%
Littleton	1,976	889	120	5.4%	97%	51%
Manchester	14,751	743	850	4.3%	94%	48%
Nashua	10,429	801	616	4.7%	94%	48%
North Conway	1,614	777	90	4.4%	99%	48%
Peterborough	1,266	595	51	2.5%	**	**
Plymouth	2,293	897	139	5.7%	97%	36%
Portsmouth	2,177	966	146	6.3%	91%	58%
Rochester	6,298	1,033	434	7.1%	95%	43%
Wolfeboro	2,052	896	116	5.3%	95%	53%
Woodsville	337	514	13	2.1%	**	**

* Rates are standardized for age differences in the population using CY2006 Medicaid statewide rates as the basis. **Based on Medicaid-only members with continuous enrollment. Colebrook, Peterborough, Woodsville not reported due to small sample size.

For Medicaid-only members with continuous enrollment, the age-standardized rates of any preventive visit were highest in Portsmouth (58%), Wolfeboro (53%), Derry (52%), Littleton (51%), Manchester (48%), and Nashua (48%). The lowest rates of preventive visits were in Franklin (33%), Plymouth (36%), Keene (40%), Berlin (40%), Exeter (41%), Lancaster (42%), and Laconia (42%).

DISCUSSION AND NEXT STEPS

For this study a frequent ED user was defined as a member with four or more outpatient ED visits during a year. Using administrative eligibility and claims data 5,757 frequent ED users were identified in the CY2006 Medicaid data. The frequent ED users accounted for 37,105 (41%) of all Medicaid outpatient ED use during the year. These results indicate the high prevalence of frequent ED users in NH Medicaid and the impact on total outpatient ED use. A study of the Oregon Medicaid program also found that only 3 percent of enrollees accounted for 50 percent of all ED expenditures.⁹

The prevalence of frequent ED use was high in all eligibility groups. The highest number of frequent ED users was found in the low income child eligibility group but the prevalence rate per member covered was twice as high in the low income adult, disabled physical, and disabled mental eligibility groups. Reduction of ED use may be best accomplished by targeting those members who are frequent ED users.

Frequent ED users also had higher office-clinic visit rates, higher ED visits resulting in inpatient hospitalization rates, and higher primary care access rates than other Medicaid members. These findings suggest that frequent ED users may have higher rates of illness or disease compared with other Medicaid members.*

This was the first CHIS ED study to look at the clinical diagnoses using the CCS classification system. Frequent ED users made frequent use of the outpatient ED for conditions that have often been identified in prior studies as most often non-urgent or treatable in the primary care setting. Upper respiratory infections, otitis media, superficial injury, sprains and strains, and viral infections were leading reasons for children, while disorders of teeth and jaw, sprains and strains, abdominal pain, headache, back problems, and complications of pregnancy were other leading causes for adult eligibility groups. A significant proportion of the frequent ED use was for conditions treatable by primary care practitioners in the primary care office or clinic setting.

Among continuously enrolled Medicaid-only members, 93 percent of frequent ED users did access a primary care practitioner at some time during the year and 7 percent did not access a primary care practitioner. This falls within the range of other studies that indicate 10 percent of adults enrolled in Medicaid do not have a usual source of care and 4 percent indicate the hospital ED as usual source of care.^{5,6} For frequent ED users, the average difference between the payments for an outpatient ED and office-clinic visits was \$140. For the frequent ED users, if only one outpatient ED visit had occurred in an office-clinic setting instead of the hospital ED, about \$800,000 would have been saved.

Medicaid-only members with continuous enrollment had low rates of visits identified in the claims data as preventive visits. This was particularly true for the adult low income (25%), disabled physical (24%), and disabled mental (29%) eligibility groups and these were the

* Measurement of the comparative rate of disease or illness using administrative claims can be implemented with illness risk grouping software. This was not available in the database at the time of this study.

same groups with high frequent ED use prevalence. Statistical analysis of Medicaid-only members with continuous enrollment indicated that any preventive visit reduced the likelihood that a member was a frequent ED user by 29 percent. Promoting preventive visits and efforts to increase wellness among frequent ED users may reduce the frequency of outpatient ED visits.

Poverty level (<100% FPL) was associated with a higher likelihood of a member being a frequent ED user. Efforts targeted to the poorest Medicaid members may have the greatest impact on reducing outpatient ED visits.

The number of outpatient ED visits increased by 4,492 between CY2005 and CY2006 and the rate increased by over 4 percent. Frequent ED user prevalence increased from 5,418 (5.2%) to 5,757 (5.4%) between CY2005 and CY2006. These results indicate that ED use is an ongoing and potentially growing problem in NH Medicaid.

Frequent ED users' average time between the first and second outpatient ED visit was only 50 days. This suggests that the hospital outpatient ED is an opportunity for intervention since most frequent ED users will be returning to the ED for another visit within a fairly short period of time. Furthermore, the study identified that at least 18 percent of second visits were for the same diagnosis, indicating that opportunities exist for prevention and management around the same illness for a frequent ED user.

Finally, this study replicated the CY2005 finding of high ED use rates in Franklin, Laconia, Dover, Lancaster, Rochester, Berlin, and Claremont and lower rates in the southern border areas. The high rates were driven, in part, by higher prevalence of frequent ED users in these areas. If the outpatient ED rates in these seven areas were reduced to the state average rate, an estimated \$1 million would be saved.

Next Steps

The current study provided additional information about outpatient ED use by focusing on frequent ED users. The study was descriptive and reported on prevalence and use by age, gender, and eligibility group.

A more detailed evaluation of the impact of overall illness burden of frequent ED users may be useful. An illness risk grouper can be used to quantify the overall disease burden of frequent ED users compared with other Medicaid members. An illness risk grouper uses the administrative claims data to determine episodes of acute illness or chronic disease over a period of time and then assigns to each member an overall illness risk score. A statistical model was introduced in this report but an accurate assessment of the relative illness burden of each member was not available in the study data. Further development of a statistical model for the prevalence of frequent ED user or number of outpatient ED visits in Medicaid may be informative. For example, frequent ED user status (or number of outpatient ED visits) might be predicted by a member's overall illness risk score, mental illness status, age, gender, poverty level, disability status, rural location of residence, primary care access, and preventive visit.

APPENDICES

Appendix 1: Frequent Emergency Department Users – Study Methods

This study was based on administrative eligibility and claims data from New Hampshire Medicaid for CY2006 (based on date of service).

1. Outpatient ED Visits and Frequent ED Users.

There is no standard definition for defining a frequent ED user. A study of repeat ED users in Utah defined repeat ED user as a person with 4 or more ED visits during a year.² For this NH CHIS study, a frequent ED user was defined as any member with 4 or more outpatient ED visits during the year.

Emergency department visits were selected based on UB revenue codes 0450-0459 or CPT codes 99281-99285. This definition includes revenue code 0456 hospital urgent care visits, which are sometimes excluded from other studies.

ED visits resulting in inpatient hospitalization were identified using Medicaid category of service codes 1,3,103 and reported separately. They were not included in the definition of a frequent ED user.

2. NH Medicaid AID groupings. Aggregated enrollment groupings based on the Medicaid program they were eligible for (Appendix 2 provides crosswalk to NH Medicaid detailed eligibility categories).

- Elderly
- Disabled due to physical condition
- Disabled due to mental condition
- Severely disabled children
- Low income adult
- Low income children

Members who had limited or no Medicaid benefits, referred to as the Medicare Buy-In Program (e.g., Qualified Medicare Beneficiary (QMB), or Specified Low-Income Medicare Beneficiary (SLMBY)) were excluded. The Healthy Kids Silver (SCHIP) is not a Medicaid program and members in this category were also excluded.

3. NH Medicaid was further stratified by Dual Eligible (Medicaid members who were also enrolled in Medicare) and Medicaid-only (Medicaid members who were not also enrolled in Medicare).

4. NH Medicaid Health Analysis Areas. Aggregation of zip codes based on New Hampshire Medicaid Health Analysis Area (HAA) for NH Medicaid enrollees was utilized (Appendix 3).

5. Age Groups. The age strata used in this report were 0-4, 5-9, 10-14, 15-18, 19-20, 21-24, 25-34, 35-44, 45-49, 50-54, 55-59, 60-64, 65-74, 75-84, and 85 and older. Children are defined as age 0-18. A member age 18 is considered a child as requested by New Hampshire DHHS and corresponds to the definition of child for Medicaid eligibility purposes.

6. Member Assignment. Because members may change age, location of residence, or eligibility grouping during the year, each member was assigned to one and only one category for reporting. Their eligibility group and Health Analysis Area on the last day of the last month enrolled and their age on the first day of the last month enrolled were used. This methodology is consistent with other NH CHIS reporting.

10. Office/Clinic Visit Definition. Office or Clinic visits were identified based on CPT codes: 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99354, 99355, 99381, 99382, 99383, 99384, 99385, 99386, 99387, 99391, 99392, 99393, 99394, 99395, 99396, 99397, 99401, 99402, 99403, 99404, 99411, 99412, 99420, 99429, 99432, T1015, 99241, 99242, 99243, 99244, 99245 or UB revenue codes 510-519, 520-529, or 983. This definition was based on codes found in NCQA HEDIS specifications plus additional codes for NH rural health centers and federally qualified health centers.

11. Access to a Primary Care Practitioner. Access to primary care practitioner measures any visit with a primary care practitioner during the year. This includes both visits for preventive services and visits for illnesses. The codes used for this measure were based on NCQA HEDIS specifications with some additions and modifications based on review of NH Medicaid administrative claims data to ensure that hospital-clinic and rural health clinic settings were included. Only members with continuous enrollment during the year are included in the measure. Because this is a combined measurement for children and adults and because age ranges used in this report are different from HEDIS, the rates of preventive visits in this report will not match well child preventive visit rates in other NH CHIS reports.

CPT codes 99201,99202,99203,99204,99205,99211,99212,99213,99214,99215,99241,99242,99243,99244,99245, 99341,99342,99343,99344,99345,99346,99347,99348,99349,99350,99381,99382,99383,99384,99385,99386,99387, 99391,99392,99393,99394,99395,99396,99397,99401,99402,99403,99404,99411,99412,99420,99429,99432 or any diagnosis code V202,V700,V703,V705,V706,V708,V709 or CPT/HCPC codes T1015,99354,99355,99432 or UB revenue codes 0510 - 0529 or 0770,0771,0779,0983

and MHIC provider specialty codes:

0101 Hospital / General
0105 Hospital / Ancillary
0201 Hospital / Outpatient
1002 Misc Facility / Urgent Care Center
1009 Misc Facility / Misc Facility Use
1101 Clinic Facilities / Services
1201 Rural Health Centers
3001 Primary Care - Family / General Practice
3101 Primary Care - Internal Medicine
3201 Primary Care - Pediatrics
5201 Licensed Nurses (includes NP)
4601 Physicians Assistants
3906 Obstetrics / Gynecology

Excludes inpatient hospital claims and emergency department services claims

8. Preventive Visits. For preventive visits for children, NCQA HEDIS provides coding for well child and adolescent well care visits. There is no measure that is specific to preventive visits for adults in NCQA HEDIS – the HEDIS Adult Access to Preventive/Ambulatory Health Services measure is an access measure and would include both preventive visits and visits for illness. The preventive visit measure was constructed by using the HEDIS coding for well child and adolescent well care visits and adding additional codes specific to preventive visits to ensure that visits identified as preventive for adults were included. Additional modifications were based on review of NH Medicaid administrative claims data to ensure that hospital-clinic and rural health clinic settings were included. Only members with continuous enrollment during the year are included in the measure. Because this is a combined measurement for children and adults and because the age ranges used in this report are different from HEDIS, the rates of preventive visit in this report will not match well child preventive visit rates in other NH CHIS reports.

CPT 99381,99382,99383,99384,99385,99386,99387,99391,99392,99393,99394,99395,99396,99397, 99432, 99401,99402,99403,99404,99411,99412,99420,99429
 or any diagnosis code V202,V700,V703,V705,V706,V708,V709
 or UB revenue codes 0770,0771,0779

and MHIC provider specialty codes:

- 0101 Hospital / General
- 0105 Hospital / Ancillary
- 0201 Hospital / Outpatient
- 1002 Misc Facility / Urgent Care Center
- 1009 Misc Facility / Misc Facility Use
- 1101 Clinic Facilities / Services
- 1201 Rural Health Centers
- 3001 Primary Care - Family / General Practice
- 3101 Primary Care - Internal Medicine
- 3201 Primary Care - Pediatrics
- 5201 Licensed Nurses (includes NP)
- 4601 Physicians Assistants
- 3906 Obstetrics / Gynecology

Excludes inpatient hospital claims and emergency department services claims

13. Payments. For Medicaid, payments are determined as the claim payments to the provider from the administrative claim files. NH Medicaid may make retroactive payment settlements with hospitals. This study is based only on the payments reflected in the administrative claim files and could not adjust for any retroactive payment settlements.

14. Clinical Classification Software (CCS)

The clinical causes of outpatient ED, office-clinic, and ED resulting in inpatient hospitalization were assigned using the ICD-9-CM (International Classification of Diseases, Ninth Revision) diagnosis on the administrative claims. Emergency department visits were aggregated into clinically meaningful groupings using the Clinical Classification Software (CCS) for ICD-9-CM from the Agency for Healthcare Research and Quality (AHRQ).⁷ One example, CCS 92 Otitis media and related conditions, is provided below.

Procedure	ICD-9-CM codes
92 Otitis media and related conditions	381.00, 381.01, 381.02, 381.03, 381.04, 381.05, 381.06, 381.10, 381.19, 381.20, 381.29, 38.13, 38.14, 381.50, 381.51, 381.52, 381.60, 381.61, 381.62, 381.63, 381.7, 381.81, 381.89, 381.9, 382.00, 382.01, 382.02, 382.1, 382.2, 382.3, 382.4, 382.9, 383.00, 383.01, 383.02, 383.1, 383.20, 383.21, 383.22, 383.30, 383.31, 383.32, 383.33, 383.81, 383.89, 383.9, 384.20, 384.21, 384.22, 384.23, 384.24, 384.25, 384.81, 384.82, 384.9, 385.00, 385.01, 385.02, 385.03, 385.09, 385.10, 385.11, 385.12, 385.13, 385.19, 385.21, 385.22, 385.23, 385.24, 387.0, 387.1, 387.2, 387.8, 387.9

15. Selected Diagnoses Identified as Non-Urgent or Treatable in the Primary Care Setting.

The previous NH CHIS emergency department study identified a selected subset of specific ICD-9-CM diagnostic categories as having a higher likelihood for being non-urgent or treatable in the primary care setting rather than the hospital ED.¹

The criteria used to define these ICD-9-CM diagnosis codes included:

- diagnosis is non-injury;
- diagnosis is not dental (dental data was incomplete in the CHIS commercial data);
- high ED volume;
- ED visits leading to inpatient hospitalization were rare;
- ED average payment per visit was low;
- office-clinic visit volume for same diagnosis is high relative to ED visit volume; and
- clinical review of the ICD-9-CM codes selected.

Upon clinical review, some additional “adjacent” ICD-9-CM codes that were lower volume were added to the codes selected. This process resulted in the following 15 groups:

- Sore throat (Strep) 034.0
- Viral Infection (unspecified) 079.99
- Anxiety (unspecified or generalized) 300.00, 300.02
- Conjunctivitis (acute or unspecified) 372.00, 372.30
- External and middle ear infections (acute or unspecified) 380.10, 381.00, 381.01, 381.4, 382.00, 382.9
- Upper respiratory infections (acute or unspecified) 461.9, 473.9, 462, 465.9
- Bronchitis (acute or unspecified) or cough 466.0, 786.2, 490
- Asthma 493xx
- Dermatitis and rash 691.0, 691.8, 692.6, 692.9, 782.1
- Joint pain 719.40, 719.41, 719.42, 719.43, 719.44, 719.45, 719.46, 719.47, 719.48, 719.49
- Lower and unspecified back pain 724.2, 724.5
- Muscle and soft tissue limb pain 729.1, 729.5
- Fatigue 780.79
- Headache 784.0
- Abdominal pain 789.00, 789.01, 89.02, 789.03, 789.04, 789.05, 789.06, 789.07, 789.09

While the appropriateness of any specific use of the hospital outpatient ED cannot be determined from the administrative claims data, these diagnoses had high volume, were least likely to result in inpatient hospitalization, and were more likely to have treatment provided in the office-clinic setting. These conclusions were based on examination of both the NH Medicaid and NH commercial data.

16. Denominator for Population-Based Rates. This study was based on rates of use per member population covered. Not all members are covered for a full year. This is particularly true for the Medicaid population where a significant proportion of persons are not covered under Medicaid for the entire year. Therefore, a person covered for a full 12 months would be twice as likely to have an ED visit during the year compared with a person covered for only 6 months. We used standard methods to adjust our denominators for these differences in exposure time. Thus, average members (cumulative member months divided by 12) was utilized as denominator for rates in this study.

17. Standardization of rates for age differences were made in comparisons of the Medicaid frequent ED population to the all other Medicaid members. Geographical comparisons were also standardized for age differences. The indirect method of age standardization was used and is the preferred method for standardization of rates for geographical analysis of

small areas such as the HAAs used in this study. For age-standardized rates, confidence intervals were computed using methods described by Breslow and Day for indirect standardized rates.⁸ For access to primary care practitioner and preventive visit rates, confidence intervals were computed using the continuity correction as specified by NCQA specifications for HEDIS reporting.

21. Claims paid by Medicare were not available to the CHIS project and the completeness of data for NH Medicaid members who were Dual Eligible cannot be evaluated. Payment amounts for Dual Eligibles are provided but payment rates for Dual Eligible members were suppressed.

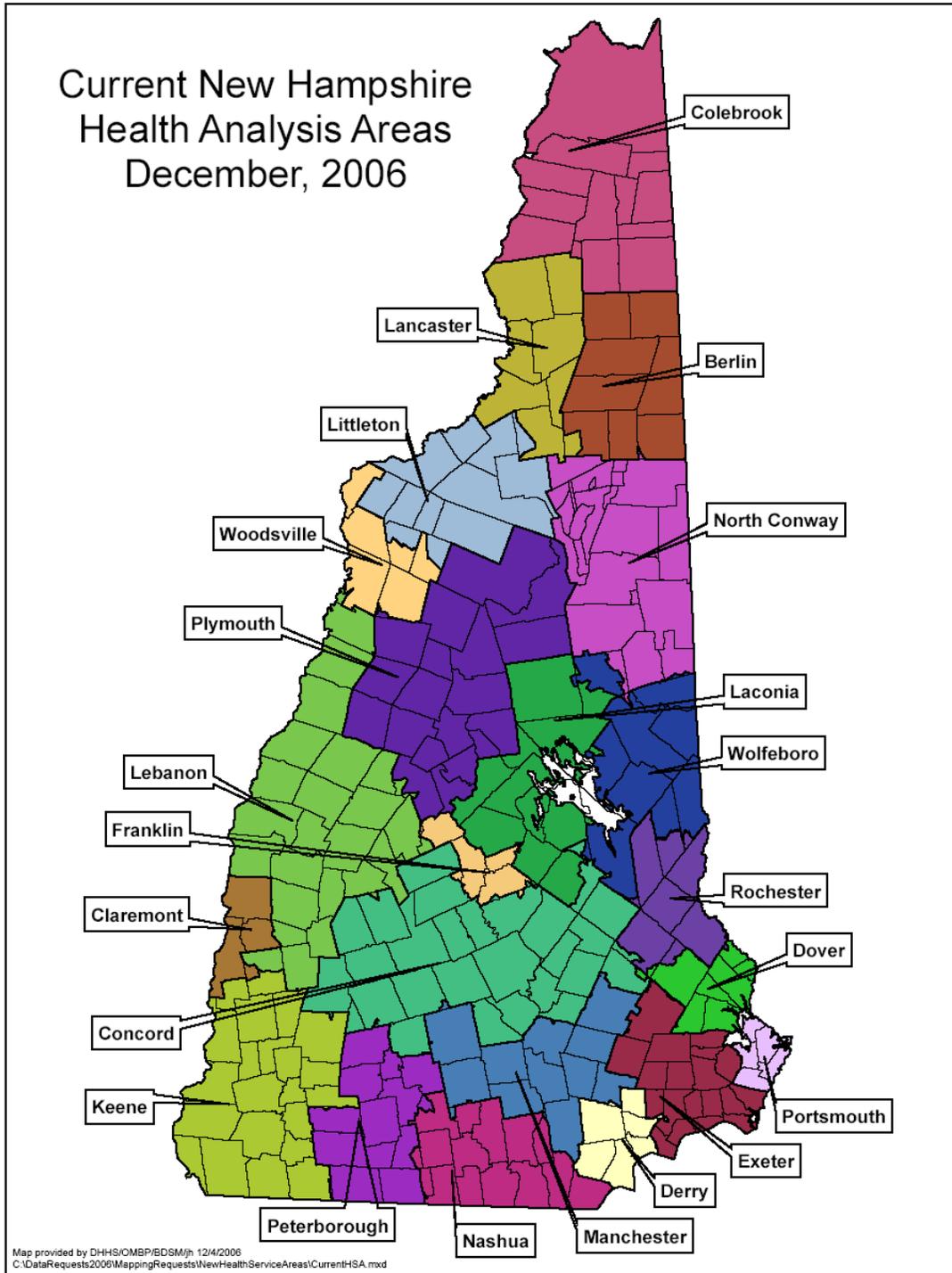
Appendix 2: NH Medicaid Eligibility Collapsed Groupings

Source: New Hampshire Comprehensive Health Information System Special Project: Defining Medicaid Eligibility Groups. Institute for Health Policy, Muskie School of Public Service, University of Southern Maine.

Aid Category w Code	Medicaid Benefits	Collapsed Groupings
10 OAA/CATEGORICALLY NEEDY	Yes	Elderly
11 OAA/MONEY PAYMENT/CATEGORICALLY NEEDY	Yes	Elderly
12 OAA/MEDICALLY NEEDY	Yes	Elderly
20 AFDC/CATEGORICALLY NEEDY	Yes	Low Income Adult/Child*
21 AFDC/MONEY PAYMENT/CATEGORICALLY NEEDY	Yes	Low Income Adult/Child
22 AFDC/MEDICALLY NEEDY	Yes	Low Income Adult/Child
24 AFDC/REG POV LVL/CAT NEEDY 185%FPL	Yes	Low Income Adult/Child
27 HEALTHY KIDS GOLD - EXPANDED ELIGIBILITY	Yes	Low Income Child
28 AFDC/POVLEV PREG WOMAN/CHILD/CAT/NEEDY170% FPL	Yes	Low Income Adult/Child
2B AFDC/HOME CARE-CHILD/SEVERE DISA/MEDI NEEDY	Yes	Severely Disabled Child
2C AFDC/CHILD WITH SEVERE DISABILITIES/CAT NEEDY	Yes	Severely Disabled Child
2D AFDC/CHILD WITH SEVERE DISABILITIES/MEDI NEEDY	Yes	Severely Disabled Child
2E AFDC/EXTENDED MA/FIRST 6 MONTH PERIOD/CAT NEEDY	Yes	Low Income Adult/Child
2F AFDC/EXT MA/SCND 6 MNTH PER/CAT NEEDY	Yes	Low Income Adult/Child
2H AFDC/POV LVL PREG WMN/CHILD/CAT NDY/REF170% FPL	Yes	Low Income Adult/Child
2K AFDC/HOME CARE-CHILD SEV DIS/CAT. NDY FOR INSTI	Yes	Severely Disabled Child
2U AFDC/AFDC-UP/MONEY PAYMENT/CATEGORICALLY NDY	Yes	Low Income Adult/Child
2V AFDC/AFDC-UP/CATEGORICALLY NEEDY/MA	Yes	Low Income Adult/Child
2W AFDC/AFDC-UP/MEDICALLY NEEDY	Yes	Low Income Adult/Child
2X AFDC/POV LVL PREG WOMEN/POV LVL CHLD CAT NEEDY	Yes	Low Income Adult/Child
30 ANB/CATEGORICALLY NEEDY	Yes	Disabled Physical
31 ANB/MONEY PAYMENT/CATEGORICALLY NEEDY	Yes	Disabled Physical
32 ANB/MEDICALLY NEEDY	Yes	Disabled Physical
40 IV-E-OR-MA /ADOPT SUB-CAT NEEDY	Yes	Low Income Child
41 AFDC/FC OR MONEY PAYMENT/CATEGORICALLY NDY	Yes	Low Income Child
42 AFDC/FC OR MEDICALLY NEEDY	Yes	Low Income Child
50 APTD/MENTAL/CATEGORICALLY NEEDY	Yes	Disabled Mental
51 APTD/MENTAL/MONEY PAYMENT/CATEGORICALLY NEEDY	Yes	Disabled Mental
52 APTD/MENTAL/MEDICALLY NEEDY	Yes	Disabled Mental
61 HEALTHY KIDS SILVER	No	Omitted
66 QUALIFIED MEDICARE BENEFICIARY - SLMB120	No	Omitted
67 QUALIFIED MEDICARE BENEFICIARY - SLMB135	No	Omitted
68 QUALIFIED MEDICARE BENEFICIARY - QDWI	No	Omitted
69 QMB	No	Omitted
70 APTD/PHYSICAL/CATEGORICALLY NEEDY	Yes	Disabled Physical
71 APTD/PHYSICAL/MONEY PAYMENT	Yes	Disabled Physical
72 APTD-PHYSICAL/MEDICALLY NEEDY	Yes	Disabled Physical
80 MEAD WITH ANB/APTD APPROVAL - BLIND	Yes	Disabled Physical
81 MEAD WITH ANB/APTD APPROVAL - PHYSICAL	Yes	Disabled Physical
82 MEAD WITH ANB/APTD APPROVAL - MENTAL	Yes	Disabled Mental
83 MEAD ONLY APPROVAL - BLIND	Yes	Disabled Physical
84 MEAD ONLY APPROVAL - PHYSICAL	Yes	Disabled Physical
85 MEAD ONLY APPROVAL - MENTAL	Yes	Disabled Mental

* Age at beginning of the month is used to designate member as Child <=18 or Adult >18.

Appendix 3: Health Analysis Area Definitions



New Hampshire Health Service Area	Zip Code	Zip Name	New Hampshire Health Service Area	Zip Code	Zip Name
			Dover	03878	Somersworth
Berlin	00169	Sucess	Exeter	03042	Epping
Berlin	03570	Berlin	Exeter	03044	Fremont
Berlin	03581	Gorham	Exeter	03077	Raymond
Berlin	03588	Milan	Exeter	03290	Nottingham
Berlin	03593	Randolph	Exeter	03291	West Nottingham
Claremont	03603	Charlestown	Exeter	03819	Danville
Claremont	03743	Claremont	Exeter	03827	East Kingston
Colebrook	00170	Second College Grant	Exeter	03833	Exeter
Colebrook	00186	Erving's Location	Exeter	03842	Hampton
Colebrook	00187	Dix Grant	Exeter	03844	Hampton Falls
Colebrook	03576	Colebrook	Exeter	03848	Kingston
Colebrook	03579	Errol	Exeter	03856	Newfields
Colebrook	03592	Pittsburg	Exeter	03857	Newmarket
Colebrook	03597	West Stewartstown	Exeter	03858	Newton
Concord	03046	Dunbarton	Exeter	03859	Newton Junction
Concord	03216	Andover	Exeter	03865	Plaistow
Concord	03218	Barnstead	Exeter	03874	Seabrook
Concord	03221	Bradford	Exeter	03885	Stratham
Concord	03224	Canterbury	Franklin	03235	Franklin
Concord	03225	Center Barnstead	Franklin	03243	Hill
Concord	03229	Contoocook	Franklin	03276	Tilton
Concord	03234	Epsom	Franklin	03298	Tilton
Concord	03242	Henniker	Franklin	03299	Tilton
Concord	03244	Hillsboro	Keene	03431	Keene
Concord	03252	Lochmere	Keene	03435	Keene
Concord	03255	Newbury	Keene	03441	Ashuelot
Concord	03258	Chichester	Keene	03443	Chesterfield
Concord	03261	Northwood	Keene	03445	Sullivan
Concord	03263	Pittsfield	Keene	03446	Swanzy
Concord	03268	Salisbury	Keene	03447	Fitzwilliam
Concord	03272	South Newbury	Keene	03448	Gilsum
Concord	03275	Suncook	Keene	03450	Harrisville
Concord	03278	Warner	Keene	03451	Hinsdale
Concord	03280	Washington	Keene	03455	Marlborough
Concord	03301	Concord	Keene	03456	Marlow
Concord	03302	Concord	Keene	03457	Nelson
Concord	03303	Concord	Keene	03462	Spofford
Concord	03304	Bow	Keene	03464	Stoddard
Concord	03305	Concord	Keene	03465	Troy
Concord	03307	Loudon	Keene	03466	West Chesterfield
Concord	03837	Gilmanton Iron Works	Keene	03467	Westmoreland
Derry	03038	Derry	Keene	03469	West Swanzy
Derry	03041	East Derry	Keene	03470	Winchester
Derry	03073	North Salem	Keene	03602	Alstead
Derry	03079	Salem	Keene	03604	Drewsville
Derry	03087	Windham	Keene	03607	South Acworth
Derry	03811	Atkinson	Keene	03608	Walpole
Derry	03826	East Hampstead	Keene	03609	North Walpole
Derry	03841	Hampstead	Laconia	03220	Belmont
Derry	03873	Sandown	Laconia	03226	Center Harbor
Dover	03805	Rollinsford	Laconia	03227	Center Sandwich
Dover	03820	Dover	Laconia	03237	Gilmanton
Dover	03821	Dover	Laconia	03246	Laconia
Dover	03822	Dover	Laconia	03247	Laconia
Dover	03823	Madbury	Laconia	03249	Gilford
Dover	03824	Durham	Laconia	03253	Meredith
Dover	03825	Barrington	Laconia	03254	Moultonborough
Dover	03869	Rollinsford	Laconia	03256	New Hampton

New Hampshire Health Service Area	Zip Code	Zip Name	New Hampshire Health Service Area	Zip Code	Zip Name
Laconia	03259	North Sandwich	Manchester	03101	Manchester
Laconia	03269	Sanbornton	Manchester	03102	Manchester
Laconia	03289	Winnisquam	Manchester	03103	Manchester
Laconia	03883	South Tamworth	Manchester	03104	Manchester
Lancaster	00185	Kilkenny	Manchester	03105	Manchester
Lancaster	03582	Groveton	Manchester	03106	Hooksett
Lancaster	03583	Jefferson	Manchester	03107	Manchester
Lancaster	03584	Lancaster	Manchester	03108	Manchester
Lancaster	03587	Meadows	Manchester	03109	Manchester
Lancaster	03590	North Stratford	Manchester	03110	Bedford
Lebanon	03230	Danbury	Manchester	03111	Manchester
Lebanon	03231	East Andover	Manchester	03281	Weare
Lebanon	03233	Elkins	Nashua	03031	Amherst
Lebanon	03240	Grafton	Nashua	03033	Brookline
Lebanon	03257	New London	Nashua	03048	Greenville
Lebanon	03260	North Sutton	Nashua	03049	Hollis
Lebanon	03273	South Sutton	Nashua	03051	Hudson
Lebanon	03284	Springfield	Nashua	03052	Litchfield
Lebanon	03287	Wilmot	Nashua	03054	Merrimack
Lebanon	03601	Acworth	Nashua	03055	Milford
Lebanon	03605	Lempster	Nashua	03057	Mont Vernon
Lebanon	03741	Canaan	Nashua	03060	Nashua
Lebanon	03745	Cornish	Nashua	03061	Nashua
Lebanon	03746	Cornish Flat	Nashua	03062	Nashua
Lebanon	03748	Enfield	Nashua	03063	Nashua
Lebanon	03749	Enfield Center	Nashua	03064	Nashua
Lebanon	03750	Etna	Nashua	03076	Pelham
Lebanon	03751	Georges Mills	Nashua	03082	Lyndeborough
Lebanon	03752	Goshen	Nashua	03086	Wilton
Lebanon	03753	Grantham	North Conway	00168	Beans Purchase
Lebanon	03754	Guild	North Conway	00172	Hadleys Purchase
Lebanon	03755	Hanover	North Conway	00173	Cutts Grant
Lebanon	03756	Lebanon	North Conway	00174	Beans Grant
Lebanon	03765	Haverhill	North Conway	00176	Sargents Purchase
Lebanon	03766	Lebanon	North Conway	00177	Pinkham Grant
Lebanon	03768	Lyme	North Conway	00179	Chandlers Purchase
Lebanon	03769	Lyme Center	North Conway	00180	Thompson/Meserves Purch
Lebanon	03770	Meriden	North Conway	00181	Low and Burbanks Grant
Lebanon	03773	Newport	North Conway	00182	Crawfords Purchase
Lebanon	03777	Orford	North Conway	00183	Greens Grant
Lebanon	03779	Piermont	North Conway	00184	Martins Location
Lebanon	03781	Plainfield	North Conway	03575	Bretton Woods
Lebanon	03782	Sunapee	North Conway	03589	Mount Washington
Lebanon	03784	West Lebanon	North Conway	03812	Bartlett
Littleton	03561	Littleton	North Conway	03813	Center Conway
Littleton	03574	Bethlehem	North Conway	03817	Chocorua
Littleton	03580	Franconia	North Conway	03818	Conway
Littleton	03585	Lisbon	North Conway	03832	Eaton Center
Littleton	03586	Sugar Hill	North Conway	03838	Glen
Littleton	03595	Twin Mountain	North Conway	03845	Intervale
Littleton	03598	Whitefield	North Conway	03846	Jackson
Manchester	03032	Auburn	North Conway	03847	Kearsarge
Manchester	03034	Candia	North Conway	03849	Madison
Manchester	03036	Chester	North Conway	03860	North Conway
Manchester	03037	Deerfield	North Conway	03875	Silver Lake
Manchester	03040	East Candia	North Conway	03890	West Ossipee
Manchester	03045	Goffstown	Peterborough	03043	Francetown
Manchester	03053	Londonderry	Peterborough	03047	Greenfield
Manchester	03070	New Boston	Peterborough	03071	New Ipswich

New Hampshire Health Service Area	Zip Code	Zip Name	New Hampshire Health Service Area	Zip Code	Zip Name
Peterborough	03084	Temple	Wolfeboro	03897	Wonalancet
Peterborough	03440	Antrim	Woodsville	03238	Glenciff
Peterborough	03442	Bennington	Woodsville	03740	Bath
Peterborough	03444	Dublin	Woodsville	03771	Monroe
Peterborough	03449	Hancock	Woodsville	03774	North Haverhill
Peterborough	03452	Jaffrey	Woodsville	03780	Pike
Peterborough	03458	Peterborough	Woodsville	03785	Woodsville
Peterborough	03461	Rindge			
Peterborough	03468	West Peterborough			
Plymouth	03215	Waterville Valley			
Plymouth	03217	Ashland			
Plymouth	03222	Bristol			
Plymouth	03223	Campton			
Plymouth	03232	East Hebron			
Plymouth	03241	Hebron			
Plymouth	03245	Holderness			
Plymouth	03251	Lincoln			
Plymouth	03262	North Woodstock			
Plymouth	03264	Plymouth			
Plymouth	03266	Rumney			
Plymouth	03274	Stinson Lake			
Plymouth	03279	Warren			
Plymouth	03282	Wentworth			
Plymouth	03293	Woodstock			
Portsmouth	03801	Portsmouth			
Portsmouth	03802	Portsmouth			
Portsmouth	03803	Portsmouth			
Portsmouth	03804	Portsmouth			
Portsmouth	03840	Greenland			
Portsmouth	03843	Hampton			
Portsmouth	03854	New Castle			
Portsmouth	03862	North Hampton			
Portsmouth	03870	Rye			
Portsmouth	03871	Rye Beach			
Rochester	03815	Center Strafford			
Rochester	03835	Farmington			
Rochester	03839	Rochester			
Rochester	03851	Milton			
Rochester	03852	Milton Mills			
Rochester	03855	New Durham			
Rochester	03866	Rochester			
Rochester	03867	Rochester			
Rochester	03868	Rochester			
Rochester	03884	Strafford			
Rochester	03887	Union			
Wolfeboro	03809	Alton			
Wolfeboro	03810	Alton Bay			
Wolfeboro	03814	Center Ossipee			
Wolfeboro	03816	Center Tuftonboro			
Wolfeboro	03830	East Wakefield			
Wolfeboro	03836	Freedom			
Wolfeboro	03850	Melvin Village			
Wolfeboro	03853	Mirror Lake			
Wolfeboro	03864	Ossipee			
Wolfeboro	03872	Sanbornville			
Wolfeboro	03882	Effingham			
Wolfeboro	03886	Tamworth			
Wolfeboro	03894	Wolfeboro			
Wolfeboro	03896	Wolfeboro Falls			

Appendix 4: Frequent ED User Utilization by Clinical Classification Software (CCS) Groupings

The causes of emergency department use were evaluated using the ICD-9-CM (International Classification of Diseases, Ninth Revision) diagnosis on the administrative claims. Emergency department visits were aggregated into clinically meaningful groupings using the Clinical Classification Software (CCS) for ICD-9-CM from the Agency for Healthcare Research and Quality (AHRQ).⁶ For frequent ED users, outpatient ED use, and ED use resulting in inpatient hospitalization, office-clinic visits are reported below by CCS category. Average payment per outpatient ED and office-clinic visit are reported. A supplemental table provides mental health specialist visits for mental illness CCS categories.

Frequent ED Users Utilization and Average Payments by CCS						
CCS	CCS Description	Outpatient Emergency Department Visits	Emergency Department Visits Resulting in Inpatient Hospitalization	Office- Clinic Visits	Average Payment for Outpa- tient ED Visit	Average Pay- ment for Office- Clinic Visit
Total All CCS Categories						
		37,105	2,154	56,891	\$210	\$70
Infectious and parasitic diseases						
	Total	747	37	1,684	\$157	\$64
1	Tuberculosis	0	0	0	\$0	\$0
2	Septicemia (except in labor)	17	19	13	\$113	\$94
3	Bacterial infection, unspecified site	3	1	24	\$101	\$82
4	Mycoses	112	1	250	\$116	\$55
5	HIV infection	5	1	86	\$236	\$86
6	Hepatitis	8	4	129	\$281	\$52
7	Viral infections	499	8	559	\$157	\$59
8	Other infections, including parasitic	44	3	67	\$140	\$66
9	Sexually transmitted infections (not HIV or hepatitis)	2	0	5	\$210	\$55
10	Immunizations and screening for infectious diseases	57	0	551	\$244	\$72
Neoplasms						
	Total	47	18	811	\$227	\$246
11	Cancer of head and neck	3	1	31	\$135	\$108
12	Cancer of esophagus	1	0	5	\$0	\$20
13	Cancer of stomach	1	0	6	\$0	\$457
14	Cancer of colon	2	1	11	\$424	\$514
15	Cancer of rectum and anus	0	0	48	\$0	\$8
16	Cancer of liver and intrahepatic bile duct	1	1	5	\$94	\$747

17	Cancer of pancreas	0	0	1	\$0	\$151
18	Cancer of other GI organs, peritoneum	0	0	0	\$0	\$0
19	Cancer of bronchus, lung	9	6	103	\$229	\$531
20	Cancer, other respiratory and intrathoracic	1	0	1	\$357	\$19
21	Cancer of bone and connective tissue	1	1	37	\$0	\$71
22	Melanomas of skin	1	0	8	\$302	\$111
23	Other non-epithelial cancer of skin	0	0	17	\$0	\$126
24	Cancer of breast	0	0	121	\$0	\$467
25	Cancer of uterus	0	0	0	\$0	\$0
26	Cancer of cervix	0	0	42	\$0	\$124
27	Cancer of ovary	1	1	27	\$0	\$219
28	Cancer of other female genital organs	0	0	4	\$0	\$227
29	Cancer of prostate	0	0	15	\$0	\$32
30	Cancer of testis	0	0	9	\$0	\$301
31	Cancer of other male genital organs	0	0	0	\$0	\$0
32	Cancer of bladder	0	0	1	\$0	\$0
33	Cancer of kidney and renal pelvis	1	0	9	\$213	\$543
34	Cancer of other urinary organs	0	0	0	\$0	\$0
35	Cancer of brain and nervous system	0	1	29	\$0	\$620
36	Cancer of thyroid	0	0	1	\$0	\$69
37	Hodgkin's disease	0	0	0	\$0	\$0
38	Non-Hodgkin's lymphoma	1	0	21	\$60	\$177
39	Leukemias	4	0	41	\$45	\$163
40	Multiple myeloma	0	0	1	\$0	\$31
41	Cancer, other Unspecified primary	2	0	22	\$103	\$94
42	Secondary malignancies	7	4	18	\$197	\$128
43	Malignant neoplasm without specification of site	0	0	5	\$0	\$68
44	Neoplasms of unspecified nature or uncertain behavior	2	1	70	\$757	\$74
45	Maintenance chemotherapy, radiotherapy	0	0	10	\$0	\$162
46	Benign neoplasm of uterus	1	0	4	\$433	\$143
47	Other unspecified benign neoplasm	8	1	88	\$325	\$61
Endocrine; nutritional; and metabolic diseases and immunity disorders						
	Total	410	108	2,321	\$207	\$67
48	Thyroid disorders	7	0	180	\$321	\$62
49	Diabetes mellitus without complication	71	0	792	\$181	\$55
50	Diabetes mellitus with complications	176	73	608	\$223	\$57
51	Other endocrine disorders	22	5	62	\$230	\$74
52	Nutritional deficiencies	1	1	22	\$0	\$35
53	Lipidosis	1	0	214	\$43	\$47
54	Gout and other crystal arthropathies	38	1	16	\$95	\$38
55	Fluid and electrolyte disorders	68	20	39	\$261	\$203
56	Cystic fibrosis	0	1	12	\$0	\$276
57	Immunity disorders	0	1	12	\$0	\$727

58	Other nutritional, endocrine, and metabolic disorders	26	6	364	\$150	\$81
Diseases of the blood and blood-forming organs						
	Total	52	22	285	\$294	\$111
59	Anemia	26	13	217	\$210	\$117
60	Acute posthemorrhagic anemia	2	0	1	\$1,164	\$1,179
61	Sickle cell anemia	1	0	2	\$0	\$21
62	Coagulation and hemorrhagic disorders	15	3	41	\$289	\$97
63	Disease of white blood cells	8	6	11	\$399	\$45
64	Other hematologic conditions	0	0	13	\$0	\$39
Mental illness						
	Total	2,708	412	4,756	\$182	\$64
65	Mental retardation	2	0	112	\$297	\$45
66	Alcohol-related mental disorders	312	60	97	\$252	\$63
67	Substance-related mental disorders	143	18	268	\$200	\$62
68	Senility and organic mental disorders	34	4	75	\$283	\$43
69	Affective disorders	425	178	1,494	\$171	\$67
70	Schizophrenia and related disorders	270	68	495	\$126	\$45
71	Other psychoses	82	7	87	\$169	\$76
72	Anxiety, somatoform, dissociative, and personality disorders	654	22	1,048	\$166	\$66
73	Preadult disorders	49	2	248	\$245	\$74
74	Other mental conditions	709	52	808	\$183	\$69
75	Personal history of mental disorder, mental and behavioral problems, observation and screening for mental disorders	28	1	24	\$125	\$99
Diseases of the nervous system and sense organs						
	Total	4,403	103	5,691	\$194	\$62
76	Meningitis (except that caused by tuberculosis or STD)	3	3	4	\$926	\$80
77	Encephalitis (except that caused by tuberculosis and STD)	2	2	4	\$273	\$74
78	Other CNS infection and poliomyelitis	0	0	0	\$0	\$0
79	Parkinson's disease	0	0	19	\$0	\$14
80	Multiple sclerosis	25	3	75	\$410	\$62
81	Other hereditary and degenerative nervous system conditions	29	4	85	\$226	\$82
82	Paralysis	5	0	70	\$153	\$127
83	Epilepsy, convulsions	407	45	574	\$368	\$74
84	Headache, including migraine	1,720	19	1,212	\$223	\$60
85	Coma, stupor, and brain damage	27	5	28	\$430	\$54
86	Cataract	0	0	33	\$0	\$50
87	Retinal detachments, defects, vascular occlusion, and retinopathy	0	0	23	\$0	\$101
88	Glaucoma	0	0	58	\$0	\$35
89	Blindness and vision defects	21	0	68	\$134	\$60
90	Inflammation, infection of eye (except that caused by tuberculosis and STD)	246	1	292	\$104	\$52

91	Other eye disorders	49	1	239	\$113	\$63
92	Otitis media and related conditions	1,159	1	1,668	\$110	\$59
93	Conditions associated with dizziness or vertigo	193	3	151	\$276	\$57
94	Other ear and sense organ disorders	324	0	508	\$100	\$54
95	Other nervous system disorders	193	16	580	\$221	\$71
Diseases of the circulatory system						
	Total	1,603	210	2,631	\$318	\$58
96	Heart valve disorders	2	0	58	\$253	\$96
97	Peri-, endo-, and myocarditis, cardiomyopathy (except that caused by tuberculosis and STD)	10	6	61	\$414	\$70
98	Essential hypertension	30	3	579	\$247	\$48
99	Hypertension with complications and secondary hypertension	8	1	50	\$567	\$109
100	Acute myocardial infarction	9	7	6	\$552	\$165
101	Coronary atherosclerosis and other heart diseases	39	24	241	\$274	\$48
102	Nonspecific chest pain	1,045	50	471	\$344	\$76
103	Pulmonary heart disease	21	16	71	\$209	\$93
104	Other and ill-defined heart disease	6	0	20	\$225	\$52
105	Conduction disorders	4	3	17	\$79	\$24
106	Cardiac dysrhythmias	164	14	354	\$320	\$54
107	Cardiac arrest and ventricular fibrillation	7	0	0	\$247	\$0
108	Congestive heart failure, nonhypertensive	93	44	150	\$227	\$40
109	Acute cerebrovascular disease	16	7	86	\$390	\$52
110	Occlusion or stenosis of precerebral arteries	0	1	10	\$0	\$40
111	Other and ill-defined cerebrovascular disease	0	0	14	\$0	\$49
112	Transient cerebral ischemia	14	4	8	\$492	\$29
113	Late effects of cerebrovascular disease	1	2	11	\$0	\$24
114	Peripheral and visceral atherosclerosis	7	5	53	\$38	\$57
115	Aortic, peripheral, and visceral artery aneurysms	1	0	5	\$170	\$14
116	Aortic and peripheral arterial embolism or thrombosis	4	1	10	\$401	\$128
117	Other circulatory disease	22	11	128	\$304	\$51
118	Phlebitis, thrombophlebitis and thromboembolism	41	4	86	\$176	\$54
119	Varicose veins of lower extremity	3	0	19	\$114	\$26
120	Hemorrhoids	39	1	42	\$118	\$45
121	Other disease of veins and lymphatics	17	6	81	\$137	\$45
Diseases of the respiratory system						
	Total	5,374	335	7,084	\$178	\$64
122	Pneumonia (except that caused by tuberculosis and STD)	367	110	281	\$268	\$62
123	Influenza	36	1	15	\$190	\$75
124	Acute and chronic tonsillitis	121	3	116	\$197	\$57
125	Acute bronchitis	510	21	526	\$156	\$63

126	Other upper respiratory infections	1,966	7	2,629	\$123	\$59
127	Chronic obstructive pulmonary disease and bronchiectasis	592	73	803	\$203	\$63
128	Asthma	628	59	1,070	\$243	\$77
129	Aspiration pneumonitis, food/vomitus	18	15	7	\$170	\$28
130	Pleurisy, pneumothorax, pulmonary collapse	53	6	33	\$282	\$54
131	Respiratory failure, insufficiency, arrest (adult)	21	25	13	\$242	\$82
132	Lung disease due to external agents	3	1	2	\$372	\$53
133	Other lower respiratory disease	888	12	994	\$210	\$66
134	Other upper respiratory disease	171	2	595	\$137	\$63
Diseases of the digestive system						
	Total	3,510	235	2,819	\$176	\$70
135	Intestinal infection	97	17	103	\$216	\$73
136	Disorders of teeth and jaw	1,995	2	411	\$103	\$65
137	Disease of mouth, excluding dental	79	0	95	\$81	\$36
138	Esophageal disorders	83	6	484	\$278	\$61
139	Gastroduodenal ulcer (except hemorrhage)	3	1	13	\$721	\$54
140	Gastritis and duodenitis	81	12	50	\$257	\$58
141	Other disorders of stomach and duodenum	44	19	85	\$327	\$65
142	Appendicitis and other appendiceal conditions	9	5	1	\$1,238	\$3,320
143	Abdominal hernia	38	9	105	\$473	\$66
144	Regional enteritis and ulcerative colitis	25	13	80	\$258	\$228
145	Intestinal obstruction without hernia	28	20	9	\$231	\$100
146	Diverticulosis and diverticulitis	25	6	20	\$621	\$76
147	Anal and rectal conditions	38	0	38	\$129	\$48
148	Peritonitis and intestinal abscess	0	0	0	\$0	\$0
149	Biliary tract disease	60	26	68	\$545	\$177
150	Liver disease, alcohol-related	8	10	12	\$162	\$45
151	Other Liver diseases	24	7	141	\$347	\$80
152	Pancreatic disorders (not diabetes)	74	34	72	\$392	\$48
153	Gastrointestinal hemorrhage	97	27	101	\$265	\$54
154	Noninfectious gastroenteritis	295	8	167	\$268	\$57
155	Other gastrointestinal disorders	407	13	764	\$209	\$62
Diseases of the genitourinary system						
	Total	1,639	114	2,936	\$281	\$70
156	Nephritis, nephrosis, renal sclerosis	5	2	9	\$124	\$146
157	Acute and unspecified renal failure	25	31	38	\$89	\$69
158	Chronic renal failure	2	0	10	\$14	\$65
159	Urinary tract infections	592	50	504	\$223	\$65
160	Calculus of urinary tract	146	8	110	\$507	\$132
161	Other disease of kidney and ureters	10	5	42	\$415	\$178
162	Other disease of bladder and urethra	2	1	62	\$136	\$63
163	Genitourinary symptoms and ill-defined conditions	203	1	596	\$178	\$57
164	Hyperplasia of prostate	0	0	0	\$0	\$0

165	Inflammatory conditions of male genital organs	36	1	49	\$172	\$56
166	Other male genital disorders	44	0	66	\$181	\$95
167	Nonmalignant breast conditions	35	1	161	\$139	\$63
168	Inflammatory disease of female pelvic organs	85	1	201	\$315	\$67
169	Endometriosis	19	2	59	\$224	\$69
170	Prolapse of female genital organs	0	0	1	\$0	\$19
171	Menstrual disorders	116	1	424	\$239	\$66
172	Ovarian cyst	94	8	89	\$657	\$93
173	Menopausal disorders	2	0	42	\$1,889	\$44
174	Female infertility	1	0	9	\$411	\$67
175	Other female genital disorders	222	2	464	\$303	\$67
Complications of pregnancy; childbirth; and the puerperium						
	Total	913	33	2,481	\$276	\$111
176	Contraceptive and procreative management	4	0	451	\$105	\$80
177	Spontaneous abortion	39	1	29	\$497	\$67
178	Induced abortion	3	1	1	\$726	\$22
179	Postabortion complications	3	0	0	\$347	\$0
180	Ectopic pregnancy	0	0	0	\$0	\$0
181	Other complications of pregnancy	626	21	218	\$269	\$113
182	Hemorrhage during pregnancy, abruptio placenta, placenta previa	116	0	75	\$282	\$84
183	Hypertension complicating pregnancy, childbirth and the puerperium	1	1	24	\$603	\$94
184	Early or threatened labor	16	0	107	\$248	\$125
185	Prolonged pregnancy	0	0	3	\$0	\$106
186	Diabetes or abnormal glucose tolerance complicating pregnancy, childbirth, or the puerperium	3	0	41	\$212	\$74
187	Malposition, malpresentation	1	0	5	\$463	\$236
188	Fetopelvic disproportion, obstruction	0	0	2	\$0	\$1,098
189	Previous C-section	1	0	1	\$176	\$68
190	Fetal distress and abnormal forces of labor	0	0	5	\$0	\$63
191	Polyhydramnios and other problems of amniotic cavity	0	0	13	\$0	\$107
192	Umbilical cord complication	0	0	0	\$0	\$0
193	Trauma to perineum and vulva	0	1	4	\$0	\$49
194	Forceps delivery	0	0	0	\$0	\$0
195	Other complications of birth, puerperium affecting management of the mother	70	8	217	\$259	\$141
196	Normal pregnancy and/or delivery	30	0	1,285	\$136	\$117
Diseases of the skin and subcutaneous tissue						
	Total	1,216	71	1,918	\$149	\$52
197	Skin and subcutaneous tissue infections	841	67	746	\$162	\$52
198	Other inflammatory condition of skin	44	3	154	\$104	\$40
199	Chronic ulcer of skin	17	0	306	\$149	\$43
200	Other skin disorders	314	1	712	\$119	\$57

Diseases of the musculoskeletal system and connective tissue						
	Total	2,812	45	7,409	\$157	\$55
201	Infective arthritis and osteomyelitis (except that caused by tuberculosis and sexually transmitted d	8	4	64	\$188	\$56
202	Rheumatoid arthritis and related disease	4	2	90	\$123	\$42
203	Osteoarthritis	26	1	289	\$108	\$65
204	Other non-traumatic joint disorders	587	2	1,482	\$144	\$55
205	Spondylosis, intervertebral disc disorders, other back problems	1,488	17	3,540	\$159	\$55
206	Osteoporosis	2	1	28	\$33	\$27
207	Pathological fracture	6	1	19	\$81	\$38
208	Acquired foot deformities	3	0	54	\$97	\$47
209	Other acquired deformities	3	3	54	\$51	\$68
210	Systemic lupus erythematosus and connective tissue disorders	6	3	36	\$151	\$52
211	Other connective tissue disease	640	9	1,591	\$160	\$53
212	Other bone disease and musculoskeletal deformities	39	2	162	\$267	\$58
Congenital anomalies						
	Total	9	3	273	\$152	\$119
213	Cardiac and circulatory congenital anomalies	2	0	63	\$126	\$192
214	Digestive congenital anomalies	1	2	13	\$94	\$86
215	Genitourinary congenital anomalies	2	1	43	\$30	\$89
216	Nervous system congenital anomalies	2	0	29	\$153	\$120
217	Other congenital anomalies	2	0	125	\$328	\$95
Certain conditions originating in the perinatal period						
	Total	18	4	116	\$233	\$199
218	Liveborn	0	0	18	\$0	\$101
219	Short gestation, low birth weight, and fetal growth retardation	1	2	19	\$40	\$341
220	Intrauterine hypoxia and birth asphyxia	0	0	1	\$0	\$288
221	Respiratory distress syndrome	0	0	2	\$0	\$102
222	Hemolytic jaundice and perinatal jaundice	3	0	14	\$55	\$95
223	Birth trauma	0	0	9	\$0	\$57
224	Other perinatal conditions	14	2	53	\$285	\$235
Injury and poisoning						
	Total	6,490	231	2,921	\$211	\$62
225	Joint disorders and dislocations, trauma-related	65	1	207	\$201	\$67
226	Fracture of neck of femur (hip)	14	9	14	\$153	\$19
227	Spinal cord injury	3	1	10	\$13	\$35
228	Skull and face fractures	20	3	13	\$575	\$54
229	Fracture of upper limb	191	6	251	\$250	\$64
230	Fracture of lower limb	136	10	155	\$232	\$73
231	Other fractures	83	6	77	\$209	\$49
232	Sprains and strains	1,775	4	685	\$177	\$59
233	Intracranial injury	54	5	89	\$567	\$41

234	Crushing injury or internal injury	34	6	21	\$184	\$61
235	Open wounds of head, neck, and trunk	403	2	112	\$221	\$53
236	Open wounds of extremities	505	3	159	\$197	\$46
237	Complication of device, implant or graft	112	27	31	\$171	\$72
238	Complications of surgical procedures or medical care	164	24	113	\$233	\$92
239	Superficial injury, contusion	1,751	4	460	\$191	\$53
240	Burns	163	1	108	\$155	\$54
241	Poisoning by psychotropic agents	114	59	20	\$469	\$486
242	Poisoning by other medications and drugs	182	46	48	\$391	\$85
243	Poisoning by nonmedicinal substances	66	4	16	\$149	\$68
244	Other injuries and conditions due to external causes	655	10	332	\$239	\$60
Symptoms; signs; and ill-defined conditions and factors influencing health status						
	Total	4,215	100	7,967	\$289	\$72
245	Syncope	156	4	121	\$376	\$77
246	Fever of unknown origin	412	6	230	\$198	\$76
247	Lymphadenitis	38	1	61	\$272	\$63
248	Gangrene	3	0	7	\$176	\$54
249	Shock	1	1	0	\$1,094	\$0
250	Nausea and vomiting	606	18	294	\$296	\$63
251	Abdominal pain	1,856	60	1,569	\$399	\$68
252	Malaise and fatigue	133	6	258	\$209	\$73
253	Allergic reactions	379	2	590	\$113	\$65
254	Rehabilitation care, fitting of prostheses, and adjustment of devices	24	1	63	\$133	\$56
255	Administrative/social admission	140	0	2,841	\$83	\$81
256	Medical examination/evaluation	46	1	758	\$133	\$75
257	Other aftercare	314	0	531	\$131	\$46
258	Other screening for suspected conditions (not mental disorders or infectious disease)	107	0	644	\$125	\$77
Residual codes; unclassified; all E codes						
	Total	179	5	697	\$172	\$67
259	Residual codes, unclassified	179	5	697	\$172	\$67
260	E Codes: All	0	0	0	\$0	\$0
Not Assigned CCS						
999	ED visit not assigned to CCS	760	68	2,091	\$230	\$90

Frequent ED Users: Mental Illness – Visits to Mental Health Specialists Supplemental Table					
CCS	CCS Description	Outpatient Emergency Department Visits	Emergency Department Visits Resulting in Inpatient Hospitalization	Office- Clinic Visits	Visits to Mental Health Specialist
	Total	2,708	412	4,756	58,577
65	Mental retardation	2	0	112	724

66	Alcohol-related mental disorders	312	60	97	89
67	Substance-related mental disorders	143	18	268	151
68	Senility and organic mental disorders	34	4	75	841
69	Affective disorders	425	178	1,494	20,238
70	Schizophrenia and related disorders	270	68	495	16,788
71	Other psychoses	82	7	87	1,367
72	Anxiety, somatoform, dissociative, and personality disorders	654	22	1,048	12,113
73	Preadult disorders	49	2	248	1,784
74	Other mental conditions	709	52	808	4,458
75	Personal history of mental disorder, mental and behavioral problems, observation and screening for mental disorders	28	1	24	24

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