



## 2005 Emergency Department Use in New Hampshire: A Comparison of the Medicaid and Commercially Insured Populations

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

March 2007

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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 (NH DHHS) and the New Hampshire Insurance Department (NHID). 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 CHIS, please visit [www.nhchis.org](http://www.nhchis.org) or contact Andrew Chalsma, NH DHHS, [achalsma@dhhs.state.nh.us](mailto:achalsma@dhhs.state.nh.us).

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## **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](mailto:kfinison@mhic.org).

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## EXECUTIVE SUMMARY

Using New Hampshire (NH) Medicaid and Commercial administrative eligibility and claims data, hospital outpatient emergency department (ED) utilization rates were studied for calendar year 2005. ED visits that result in inpatient hospitalization were not included. The ED rates were contrasted to office-clinic visit utilization rates and analyzed by age, gender, Medicaid eligibility group, and the Health Analysis Area (HAA) of the member's residence.

### Overall Findings:

- Among 105,054 NH Medicaid covered members, 41,296 (39%) had at least one ED visit and 18,145 (17%) had multiple ED visits during the year. NH Medicaid members incurred a total of 86,989 ED visits, a rate of 828 per 1,000 members.
- The NH Medicaid ED visit rate, 828 per 1,000 members, was similar to an estimated national Medicaid ED visit rate, 803 per 1,000.<sup>†</sup>
- NH Commercial members incurred a total of 101,209 ED visits, a rate of 188 per 1,000 members. The rate of ED use during 2005 among NH Medicaid members was 4.4 times higher than the rate among NH Commercial members.
- Comparing the ratio of ED visits to office-clinic visits, the ratio was 3.1 times higher in NH Medicaid (0.18) compared to NH Commercial (0.06).
- For NH Medicaid, 17% of members used the ED multiple times during the year while only 3% of NH Commercial members used the hospital ED more than once during the year.
- Multiple ED users accounted for 73% of all NH Medicaid ED use. Among NH Medicaid members, 3,383 (8%) made five or more trips to the ED during 2005. These frequent ED users accounted for 26,290 (30%) of all hospital outpatient ED use during the year.
- Among the 18,145 NH Medicaid members who made multiple trips to the ED during 2005, 1,634 (9%) did not have any office or clinic visit during the year. This suggests that a proportion of the NH Medicaid population may not have a physician or clinic as a usual source of care.
- While NH Medicaid covers a large proportion of children, which contributes to ED use, our study revealed that ED use rates per member covered were higher among NH Medicaid adults compared with children.

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<sup>†</sup> The most current national comparative ED data is taken from the most current National Hospital Ambulatory Medical Survey (NHAMCS).<sup>1</sup> The NHAMCS data combines Medicaid with SCHIP; the NH study data excluded the SCHIP population which may explain why the NH rate is slightly higher than the national rate. The national ED rates are based on 2004 survey data; the NH study data is based on 2005 ED visits from NH Medicaid claims data.

- The NH Medicaid permanently and totally mentally disabled population had the highest ED use rate (1,534 per 1,000) and ED visit to office visit ratio (0.26 ED visits per office-clinic visit).
- Fifteen diagnostic groups selected for special study (e.g. upper respiratory, ear infection, low back pain) contributed to 25,600 (almost 30%) of total 86,989 NH Medicaid ED visits. These ED visits represent ED visits that may be most likely to be treatable in a primary care office or clinic setting. The ED visit rate for these conditions was 5.7 times higher in the NH Medicaid population compared to the NH Commercial rate.
- Among both NH Medicaid and NH Commercial populations, the lowest ED visit rates were found in southern NH HAAs (Peterborough, Keene, Exeter, Derry, Manchester, and Nashua) while northern areas of NH had higher rates.

**Limitations:** NH Commercial population only contains information on those residents whose claims are included in the NH Comprehensive Health Care Information System database, which generally only includes members whose policies were purchased in New Hampshire. Areas close to the borders of New Hampshire may be less well represented than areas in the interior.

**Conclusion and Next Steps:** These study results suggest opportunities to reduce NH Medicaid ED use for non-urgent and primary care treatable conditions. A high proportion of ED use in NH Medicaid was due to members who had multiple ED visits and some of these users had no physician office or clinic visit during the year. This suggests opportunities to develop an additional study of NH Medicaid members that use the hospital ED as their primary source of care.

# INTRODUCTION

This report was developed by the New Hampshire Comprehensive Health Care Information System (NH CHIS) to provide a detailed evaluation of the rate of use of outpatient hospital emergency department (ED) in New Hampshire.

A report from the Centers for Disease Control and Prevention, National Center for Health Statistics (NCHS) indicates that emergency department utilization increased by 18% during the decade between 1994 and 2004 in the United States.<sup>1</sup> The report also indicates that:

- Nationally the visit rate for Medicaid or SCHIP patients (803 per 1,000 persons with Medicaid or SCHIP) was higher than the rate for those with Medicare (471 per 1,000 persons with Medicare), no insurance (446 per 1,000 persons with no insurance), and private insurance (203 per 1,000 persons with private insurance).<sup>†</sup>
- Nationally, 12.9% of ED visits patients' conditions were classified as emergent. An additional 37.8% of visits were urgent, 21.8% were semi-urgent, and 12.5% were non-urgent. For the remaining 15.1% of visits, the triage status was not known or no triage system was used.<sup>‡</sup>
- About 6% of ED visits were for follow-up of a previously treated problem.

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% of ED use was for conditions that did not require treatment within the next 12 hours and 33.5% of ED use was for conditions that did not require hospital services and could be treated in the primary care setting.<sup>2</sup> Thus, previous studies indicate that ED use is high in the Medicaid population and a significant proportion of ED use may be avoidable or replaced with non-hospital primary care physician visits.

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## Overview and Purpose of Report

The purpose of this study was to describe outpatient hospital ED use in the New Hampshire Medicaid population and contrast this use with the outpatient hospital ED use in the New Hampshire commercially insured population. The scope of the study was to evaluate:

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<sup>†</sup> The most current national comparative ED data is taken from the most current National Hospital Ambulatory Medical Survey (NHAMCS). The NHAMCS data combines Medicaid with SCHIP; the NH study data excluded the SCHIP population which may explain why the NH rate is slightly higher than the national rate. The national ED rates are based on 2004 survey data; the NH study data is based on 2005 ED visits from NH Medicaid claims data.

<sup>‡</sup> The NCHS study used the following definitions: emergent, visits in which the patient should be seen in less than 15 minutes; urgent, visits in which the patient should be seen within 20-60 minutes; semi-urgent, visits in which the patient should be seen within 61-120 minutes; non-urgent visits in which the patient should be seen between 121 minutes - 24 hours; unknown or no triage, a visit in which there is no mention of an immediacy rating or no triage level in the medical record, the hospital did not perform triage, or the patient was dead on arrival.

- Outpatient hospital ED visits that did not result in inpatient hospitalization;
- Compare Medicaid with commercially insured populations;
- Compared ED visit to office-clinic visit use;
- Compare rates of use by age and gender, and Medicaid eligibility group;
- Compare rates of use by geographical area (Health Analysis Area) of patient residence;
- Compare emergency department visit rates with office/clinic visit rates;
- Compare emergency department and office-clinic visit rates by day of week (note that time of day was not available in the data sources);
- Evaluate rates of repeat emergency department use during the year; and
- Identify a subset of diagnoses that have higher likelihood of being nonurgent or treatable in the primary care setting rather than the hospital ED.

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## **Data Sources and Methods**

This study was based on administrative eligibility and claims data from New Hampshire Medicaid and the NH CHIS commercial database for the calendar year 2005 (based on date of service). Data reports were generated based on paid claims available as of January 2007. Methods used in this study are described in Appendix 1 at the end of the report.

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## **Population Studied in the Report**

We studied the 2005 experience of two NH populations: members covered by NH Medicaid and members covered by NH commercial insurance. We 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. Future studies will focus on the SCHIP population. We excluded from the NH commercial data members age 65 or older and members that resided outside of NH.

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## **Interpretation of Results**

This is the first detailed study of ED use comparing NH Medicaid and NH commercial. The large number of covered members studied in our one-year sample lends credibility to the findings. However, we provide a number of cautions about the data used and results of this study.

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. Variances in benefits and coding by commercial insurer products (EPO, HMO, Point-of-Service, Indemnity or Third Party Administrator) and plans, may contribute to variances shown in this report.

This study compared two very different populations: NH Medicaid and NH commercial. Differences in these two populations that were not adjusted for in this analysis could influ-

ence the magnitude of differences in ED use rates. 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 common in Medicaid but rare in the commercial population. Children are a relatively higher proportion of the total Medicaid population compared to the proportion of children in the total commercial population. While we evaluated age-specific rates in our analysis, we did not adjust for the differences in disease status between these two populations.

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

## RESULTS

The 2005 NH Medicaid and NH commercial outpatient hospital ED and office-clinic visit utilization, payments, and rates of use are summarized in Table 1.

Among 105,054 NH Medicaid covered members, 41,296 (39%) had at least one ED visit and 18,145 (17%) had multiple ED visits during the year. NH Medicaid members incurred a total of 86,989 ED visits, a rate of 828 per 1,000 members. Among 537,766 NH commercial covered members, 75,493 (14%) had at least one ED visit and 15,935 (3%) had multiple ED visits during the year. NH commercial members incurred a total of 101,209 ED visits, a rate of 188 per 1,000 members. The rate of ED use during 2005 among NH Medicaid members was 4.4 times higher than the rate among NH commercial members.

**Table 1. Hospital Emergency Department and Office-Clinic Visits: NH Medicaid and NH Commercial Members, 2005**

Measure	NH Medicaid	NH Commercial
Average Members Covered	105,054	537,766
Members Using Emergency Department	41,296	75,493
Members with Repeat Emergency Department Use	18,145	15,935
Number of Emergency Department Visits	86,989	101,209
Emergency Department Claim Payments	\$18,092,815	\$54,992,409
Average Payment Per Emergency Department Visit	\$208	\$543
Emergency Department Visits Per 1,000 Members	828	188
% Members with Repeat Emergency Department Use	17	3
Members with Office-Clinic Visits	95,495	424,618
Number of Office-Clinic Visits	475,943	1,698,009
Office-Clinic Visits Claim Payments	\$32,479,519	\$199,537,981
Average Payment Per Office-Clinic Visit	\$68	\$118
Office-Clinic Visits per 1,000 Members	4,530	3,158
Ratio of Emergency Department Visits to Office-Clinic Visits	0.18	0.06

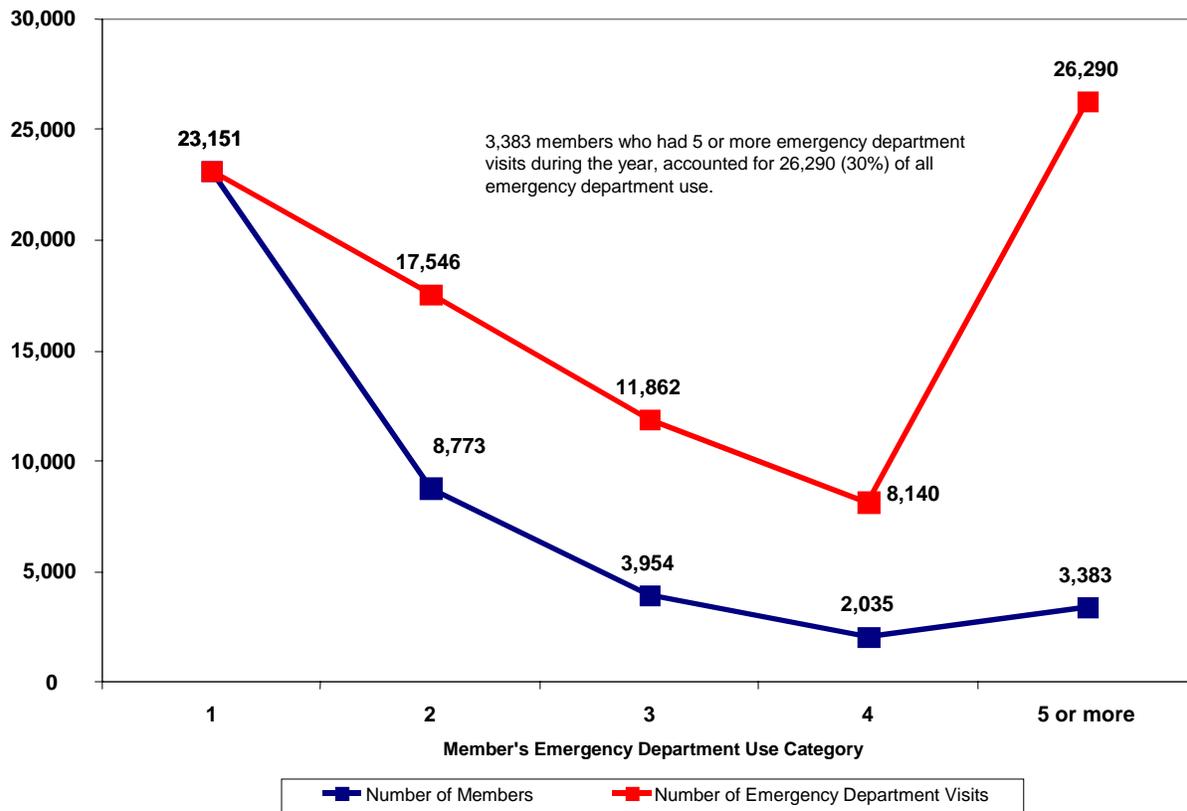
The rate of office-clinic visit use was 1.4 times higher in NH Medicaid (4,530 per 1,000) compared to NH commercial (3,158 per 1,000). Comparing the ratio of ED visits to office-clinic visits, the ratio was 3.1 times higher in NH Medicaid (0.18) compared to NH commercial (0.06). Therefore, while use of both ED and office-clinics was higher in NH Medicaid members, those members were more likely to use the ED than the office-clinic compared with NH commercial.

The average payment for ED visits was over two times higher for NH commercial and office-clinic visits slightly less than two times higher. The lower payment for NH Medicaid is a reflection of the much lower payment rates of the Medicaid program.

## Frequent Emergency Department Users

Among the 41,296 NH Medicaid members with an ED visit, 23,151 had a single ED visit during the year and 18,145 had multiple visits. The members with multiple ED visits averaged 3.5 ED visits during the year and accounted for 63,838 (73%) of the total 89,989 NH Medicaid outpatient hospital ED use. For NH Medicaid, 17% of members used the ED multiple times during the year while only 3% of NH commercial members used the hospital ED more than once during the year. Therefore, NH Medicaid members were more likely to make multiple trips to the hospital ED for outpatient service.

**Figure 1. Repeat Emergency Department Use: NH Medicaid, 2005**



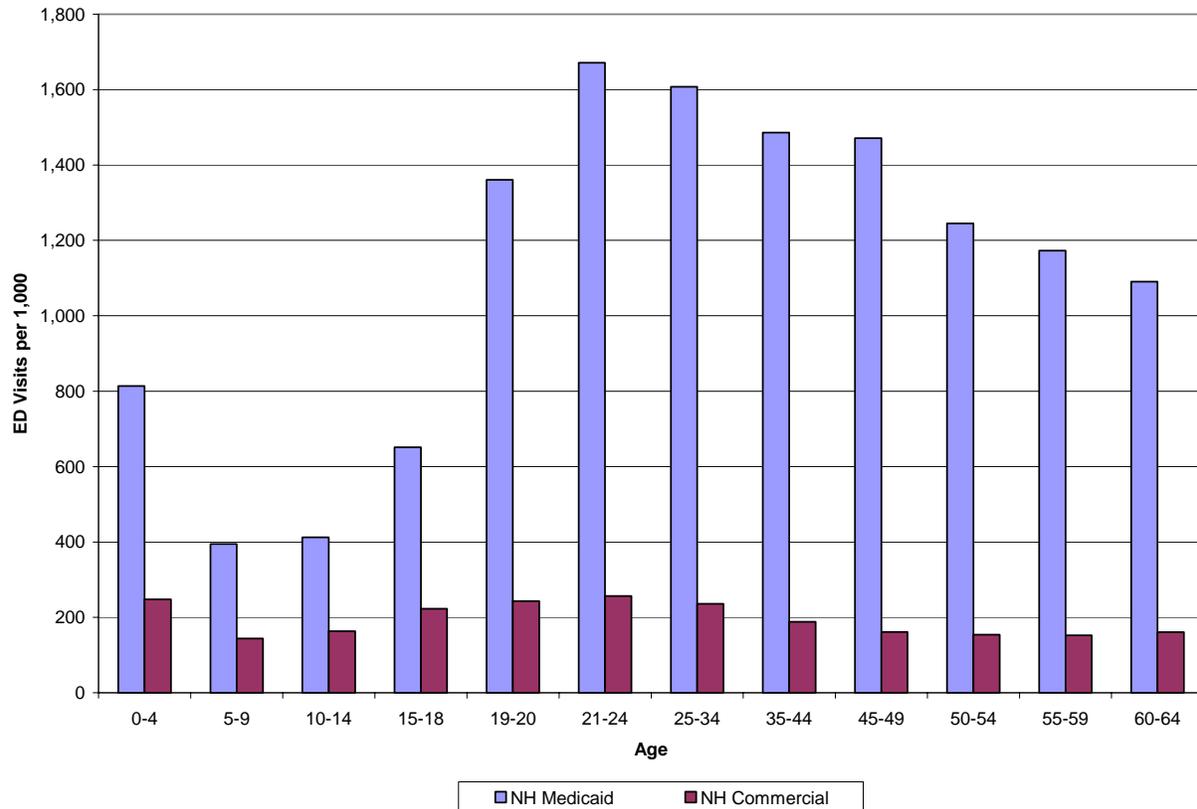
Among NH Medicaid members, 3,383 (8%) made five or more trips to the ED during 2005. These frequent ED users accounted for 26,290 (30%) of all hospital outpatient ED use during the year. Among NH Medicaid members, 640 members had 10 or more outpatient ED visits during the year.

Among the 18,145 NH Medicaid members who made multiple trips to the ED during 2005, 1,634 (9%) did not have any office or clinic visit during the year. This suggests that a proportion of the NH Medicaid population may not have a physician or clinic as a usual source of care.

## Age, Gender, and Medicaid Eligibility Group

Among the 105,054 NH Medicaid members covered, 65,939 were children age 18 and younger. Children age 5-9, 10-14, and 15-18 had lower ED visit rates than children age 0-4 or adults. In total, children incurred 37,379 of the 86,989 ED visits. Therefore, while children account for 63% of the NH Medicaid members covered, they account for only 43% of the ED visits.

**Figure 2. Emergency Department Visit Rates by Age: Medicaid Compared to NH Commercial Members, 2005** *Note: age 65 and older not shown, no comparative commercial population*



For each age group studied, the ED use rates for NH Medicaid were higher than for NH commercial. This variation in rates between NH Medicaid and NH commercial increased with age. For example, the ED use rate for children age 5-9 in NH Medicaid (395 per 1,000) was 2.7 times the ED use rate for children age 5-9 in NH commercial (144 per 1,000); the ED use rate for adults age 45-49 in NH Medicaid (1,471 per 1,000) was 9.1 times the ED use rate for adults age 45-49 in NH commercial (161 per 1,000).

Females accounted for 54,674 and males for 32,315 of the NH Medicaid ED visits. The rate of ED visits was higher among NH Medicaid females (909 per 1,000) than NH Medicaid males (719 per 1,000). This difference was also found in NH commercial members where the rate was higher in females (193 per 1,000) than males (183 per 1,000). Office-clinic visit rates were also higher in NH Medicaid females compared to males (4,966 vs. 3,948 per 1,000) and NH commercial (3,681 vs. 2,613 per 1,000). Within NH Medicaid, female ED visit rates were higher than male ED visit rates for age groups 15-59, while male ED visit

rates were higher for age 0-14, and 60 and older. We determined that part of this difference was due to 2,017 NH Medicaid ED visits during 2005 for pregnancy-related diagnoses. However, after removing these visits from the total, the NH Medicaid ED visit rate was still higher than the rate for males (876 vs. 719 per 1,000).

NH Medicaid ED and office-clinic visit use by eligibility group is reported in Table 2. The highest ED use rate (1,534 per 1,000) is among members with mental disabilities and the lowest ED use rate is among low-income children (561 per 1,000).

**Table 2. Hospital Emergency Department and Office-Clinic Visits by NH Medicaid Eligibility Group, 2005.**

Eligibility Group	Average Members Covered	Number of Emergency Department Visits	Number of Office-Clinic Visits	Emergency Department Visits Per 1,000 Members	Office-Clinic Visits per 1,000 Members	Ratio of ED Visits to Office Visits
Low Income Child	61,695	34,598	231,650	561	3,755	0.15
Low Income Adult	16,734	22,587	97,085	1,350	5,802	0.23
Severely Disabled Child	1,163	346	3,275	298	2,817	0.11
Disabled Mental	8,430	12,933	50,641	1,534	6,008	0.26
Disabled Physical	7,387	9,991	55,412	1,353	7,502	0.18
Elderly	9,646	6,294	36,982	652	3,834	0.17

### Day of Week

Information about use of hospital ED by day of week is provided in Table 2. Time of day is not available in the administrative claims data.

For the NH commercial members, use of the ED was significantly higher on weekends than weekdays. For example, compared to the lowest ED use day Thursday, ED use was 26% higher on Saturday and 33% higher on Sunday. While use rates for NH Medicaid were also higher on Saturday and Sunday, the difference to weekday use was less dramatic at only 5% higher for Saturday and Sunday.

**Table 3. Hospital Emergency Department and Office-Clinic Visits by Day of Week: NH Medicaid and NH Commercial Members, 2005**

	NH Medicaid		NH Commercial	
	ED Visits	Office-Clinic Visits	ED Visits	Office-Clinic Visits
Monday	13,405	95,679	15,266	354,366
Tuesday	12,451	101,481	13,322	360,387
Wednesday	12,177	94,524	13,023	329,037
Thursday	11,710	91,885	12,900	327,137
Friday	11,561	79,933	13,235	293,842
Saturday	12,337	8,330	16,290	23,783
Sunday	13,348	4,111	17,173	9,457

Monday also showed a slightly higher ED use rate compared to other days of the week—since time of day information is not available this could be due to patients arriving at the ED late Sunday night and the date of service being recorded during the early morning hours of Monday.

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## **Geographical Variations in Outpatient Hospital Emergency Department Use**

Evaluation of geographical variation in use was based on the Health Analysis Area (HAA) of the member's residence. Manchester, Concord, and Nashua HAAs had the highest volume of covered members while Woodsville and Colebrook HAAs had the lowest volume of covered members (see Appendix 5 for number of members and visits by area).

Rates of ED use, reported in Table 4, varied widely by geographical area. For NH Medicaid members, the ED visit rate for members living in the Laconia HAA (1,378 per 1,000 members) was 2.6 times the ED visit rate for members living in the Peterborough HAA (521 per 1,000). Franklin (1,286 per 1,000) and Berlin (1,140 per 1,000) were other high rate areas. Visit rates of more than 1,000 per 1,000 are possible because of multiple visits from single patients. For NH commercial members the ED visit rates were highest in Laconia, Franklin, Lancaster, and Berlin and lowest in Manchester, Keene, Peterborough, and Nashua. In general, the ED to office-clinic visit ratio displayed a similar ranking.<sup>†</sup>

Among both NH Medicaid and NH commercial populations, the lowest ED visit rates were found in southern NH HAAs (Peterborough, Keene, Exeter, Derry, Manchester, and Nashua), while northern areas of NH had higher rates.

Some differences were noted between NH Medicaid and NH commercial HAA rankings of ED visit rates. Dover and Rochester had higher relative ED rankings in the NH Medicaid population compared to the NH commercial population and Woodsville had a higher ranking in the NH commercial compared to NH Medicaid.

A similar pattern was found for the ratio of ED to Office-Clinic Visit Ratio. Lowest rates were found in southern NH HAAs (Peterborough, Keene, Exeter, Derry, Manchester, and Nashua), while northern areas of NH had higher rates. This suggests that the geographical variation in ED rates in NH is determined, in part, by differences in setting of care used.

The following two pages present maps based on the table above, that graphically show the geographic variation in the NH Medicaid and NH commercial data. The first map compares the ED visit rates, and the second the ED to Office-Clinic Visit Ratios.

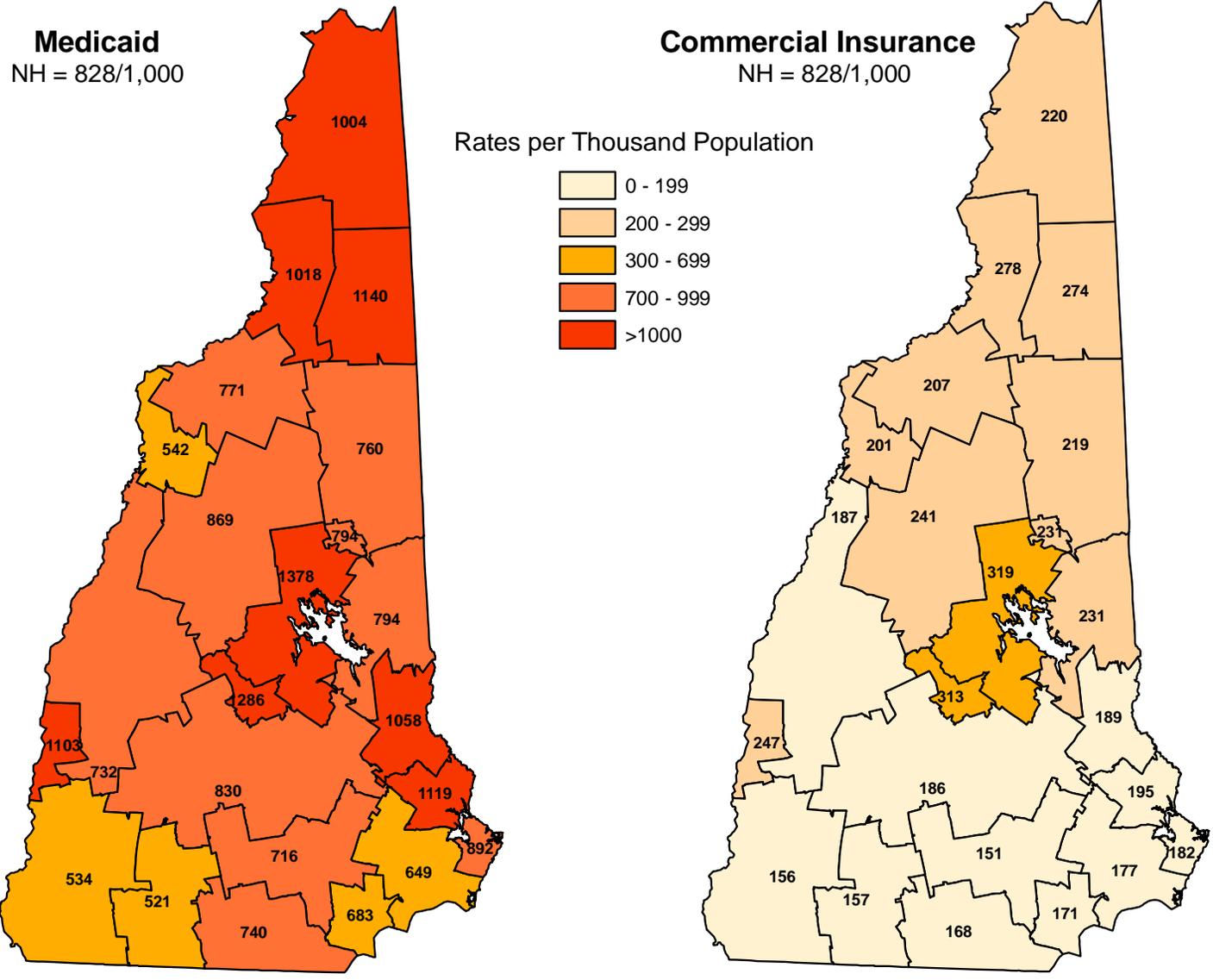
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<sup>†</sup> To examine the possible impact of different age distributions of the areas, indirect standardization of the rates was performed. When standardized, the ranking of the areas was essentially unchanged.

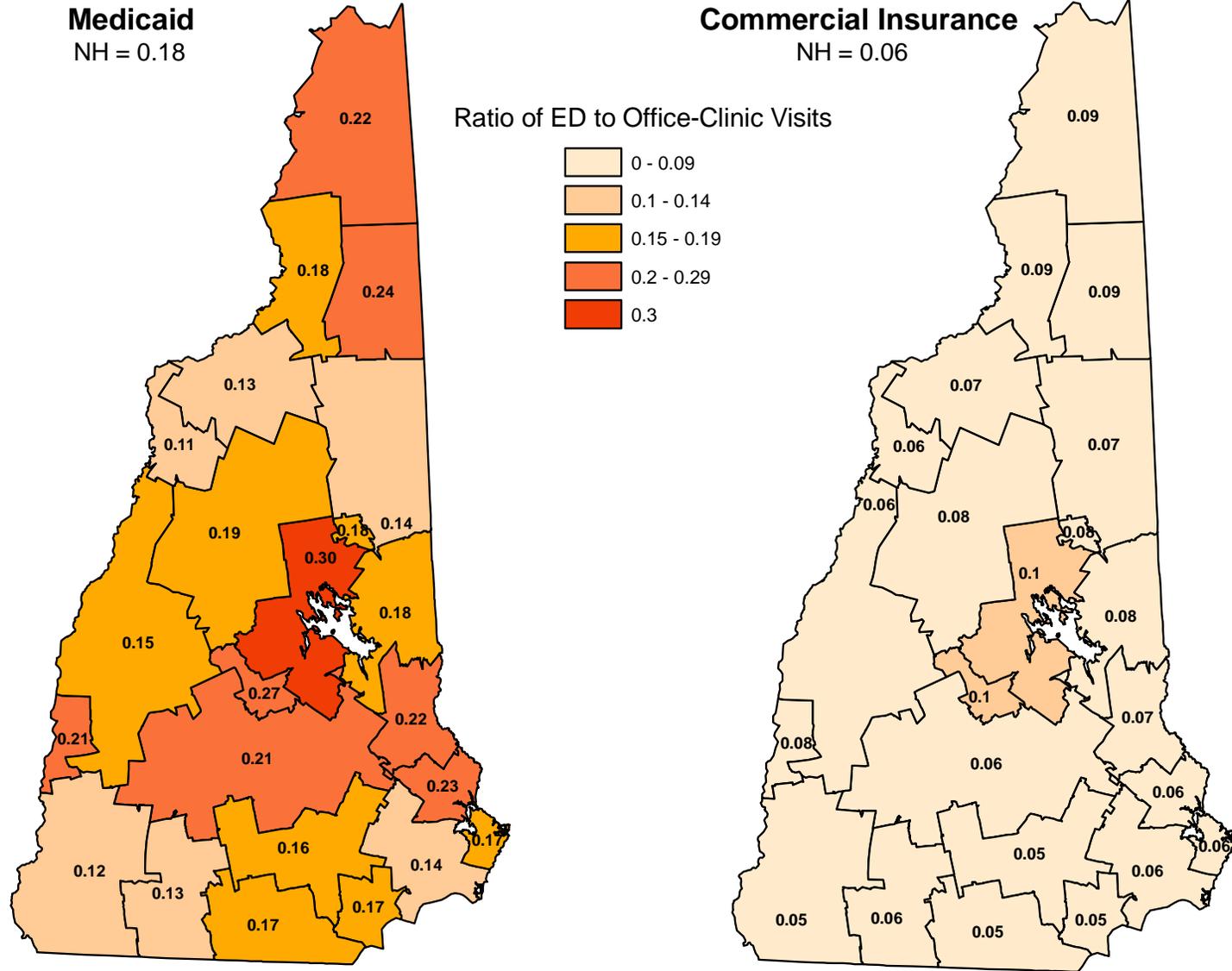
**Table 4. Hospital Emergency Department Visit Rates and Ratio of Emergency Department to Office-Clinic Visits by Health Analysis Area. NH Medicaid and NH Commercial Members, 2005.**

NH Medicaid			NH Commercial		
Health Analysis Area	ED Visits per 1,000 (ranked high to low)	ED to Office-Clinic Visit Ratio	Health Analysis Area	ED Visits per 1,000 (ranked high to low)	ED to Office-Clinic Visit Ratio
Laconia	1,378	0.30	Laconia	319	0.10
Franklin	1,286	0.27	Franklin	313	0.10
Berlin	1,140	0.24	Lancaster	278	0.09
Dover	1,119	0.23	Berlin	274	0.09
Claremont	1,103	0.21	Claremont	247	0.08
Rochester	1,058	0.22	Plymouth	241	0.08
Lancaster	1,018	0.18	Wolfeboro	231	0.08
Colebrook	1,004	0.22	Colebrook	220	0.09
Portsmouth	892	0.17	North Conway	219	0.07
Plymouth	869	0.19	Littleton	207	0.07
Concord	830	0.21	Woodsville	201	0.06
Wolfeboro	794	0.18	Dover	195	0.06
Littleton	771	0.13	Rochester	189	0.07
North Conway	760	0.14	Lebanon	187	0.06
Nashua	740	0.17	Concord	186	0.06
Lebanon	732	0.15	Portsmouth	182	0.06
Manchester	716	0.16	Exeter	177	0.06
Derry	683	0.17	Derry	171	0.05
Exeter	649	0.14	Nashua	168	0.05
Woodsville	542	0.11	Peterborough	157	0.06
Keene	534	0.12	Keene	156	0.05
Peterborough	521	0.13	Manchester	151	0.05

## Comparison of Hospital Emergency Department Visit Rates, 2005



# Comparison of Emergency Department Visits to Office/Clinic Visit Ratios, 2005



## Selected Diagnoses

A subset of fifteen common diagnostic categories based on discharge diagnosis was identified as having a higher likelihood of being non-urgent or treatable in the primary care setting rather than the hospital ED (see Appendix 1 for methods). 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) or cough, asthma (unspecified), dermatitis and rash, joint pain, lower and unspecified back pain, muscle and soft tissue limb pain, fatigue, headache, and abdominal pain.

Among the selected diagnoses studied, the major contributors to total volume of ED visits in NH Medicaid were upper respiratory infections (acute or unspecified) in both children and adults, external and middle ear infections (acute or unspecified) in children, abdominal pain in adults, bronchitis (acute or unspecified) or cough in children and adults, and lower and unspecified back pain in adults.

Among NH Medicaid members, 16,828 members had 25,600 hospital outpatient ED visits for these conditions, almost 30% of all hospital outpatient ED use for NH Medicaid members. Among NH commercial members, 19,711 members had 22,891 hospital outpatient ED visits for these conditions, 23% of all hospital outpatient ED use for NH commercial members. For these selected conditions, the ED visit rate was 5.7 times higher in the NH Medicaid population (244 per 1,000 members) compared to the NH commercial population (43 per 1,000 members). The ratio of NH Medicaid to NH commercial, 5.7 to 1, was greater than the ratio of NH Medicaid to NH commercial for all ED visits, 4.4 to 1.

**Table 5. Hospital Emergency Department and Office-Clinic Visits for Selected Diagnoses: NH Medicaid and NH Commercial Members, 2005**

Measure	NH Medicaid	NH Commercial
Average Members Covered	105,054	537,766
Members Using Emergency Department	16,828	19,711
Members with Repeat Emergency Department Use	1,990	816
Number of Emergency Department Visits	25,600	22,891
Emergency Department Claim Payments	\$4,122,773	\$9,988,679
Average Payment Per Emergency Department Visit	\$161	\$436
Emergency Department Visits Per 1,000 Members	244	43
% Members with Repeat Emergency Department Use	1.9	0.2
Members with Office Visits	50,409	199,978
Number of Office-Clinic Visits	118,480	384,308
Office-Clinic Visits Claim Payments	\$6,399,274	\$30,447,907
Average Payment Per Office-Clinic Visit	\$54	\$79
Office-Clinic Visits per 1,000 Members	1,128	715
Ratio of Emergency Department Visits to Office-Clinic Visits	0.22	0.06

For these same diagnostic conditions, NH Medicaid members also used 118,480 office-clinic visits and NH commercial members used 384,308 office-clinic visits. The rate of office-clinic

visit use for these conditions was 1.6 times higher in the NH Medicaid population (1,128 per 1,000 members) compared to the NH commercial population (715 per 1,000). The ratio of ED to office-clinic visits for these conditions was 3.6 times higher in NH Medicaid (0.22) compared to NH commercial (0.06). Therefore, NH Medicaid members were significantly more likely to use the ED instead of office-clinic compared with NH commercial members.

**Table 6. Hospital Emergency Department Visit Rates and Ratio of Emergency Department to Office-Clinic Visits by Health Analysis Area for Selected Diagnoses. NH Medicaid and NH Commercial Members, 2005.**

NH Medicaid			NH Commercial		
Health Analysis Area	ED Visits per 1,000 (ranked high to low)	ED to Office-Clinic Visit Ratio	Health Analysis Area	ED Visits per 1,000 (ranked high to low)	ED to Office-Clinic Visit Ratio
Laconia	529	0.47	Laconia	99	0.14
Franklin	445	0.36	Franklin	91	0.12
Dover	388	0.34	Lancaster	66	0.10
Rochester	317	0.27	Berlin	63	0.09
Lancaster	299	0.26	Wolfeboro	63	0.10
Claremont	296	0.24	Claremont	57	0.08
Berlin	270	0.25	Colebrook	57	0.09
Wolfeboro	263	0.27	Plymouth	55	0.08
Colebrook	257	0.25	North Conway	51	0.07
Plymouth	253	0.20	Concord	44	0.06
Portsmouth	251	0.22	Dover	42	0.06
Concord	234	0.24	Lebanon	40	0.06
North Conway	212	0.16	Rochester	40	0.06
Manchester	209	0.19	Littleton	38	0.06
Nashua	205	0.17	Woodsville	38	0.04
Lebanon	188	0.16	Portsmouth	37	0.05
Exeter	180	0.15	Derry	36	0.05
Derry	179	0.17	Nashua	35	0.05
Littleton	179	0.14	Exeter	35	0.05
Woodsville	142	0.11	Keene	33	0.04
Keene	138	0.11	Manchester	31	0.04
Peterborough	123	0.11	Peterborough	30	0.05

Among the fifteen diagnostic groups selected for study, upper respiratory infections (acute or unspecified), external and middle ear infections (acute or unspecified), and abdominal pain (unspecified or generalized) had the highest volume in NH Medicaid and NH commercial.

Among NH Medicaid members, 4,702 members had 5,476 ED visits for upper respiratory infections and 420 (9%) had a repeat ED visit for the same condition during the year. Among NH commercial members, 4,404 members had 4,469 ED visits and 136 (3%) had a repeat ED visit for the same condition. Therefore, among members visiting the hospital ED for upper respiratory infections, NH Medicaid members were 3 times as likely to visit the hospital ED again during the year for the same condition compared to NH commercial

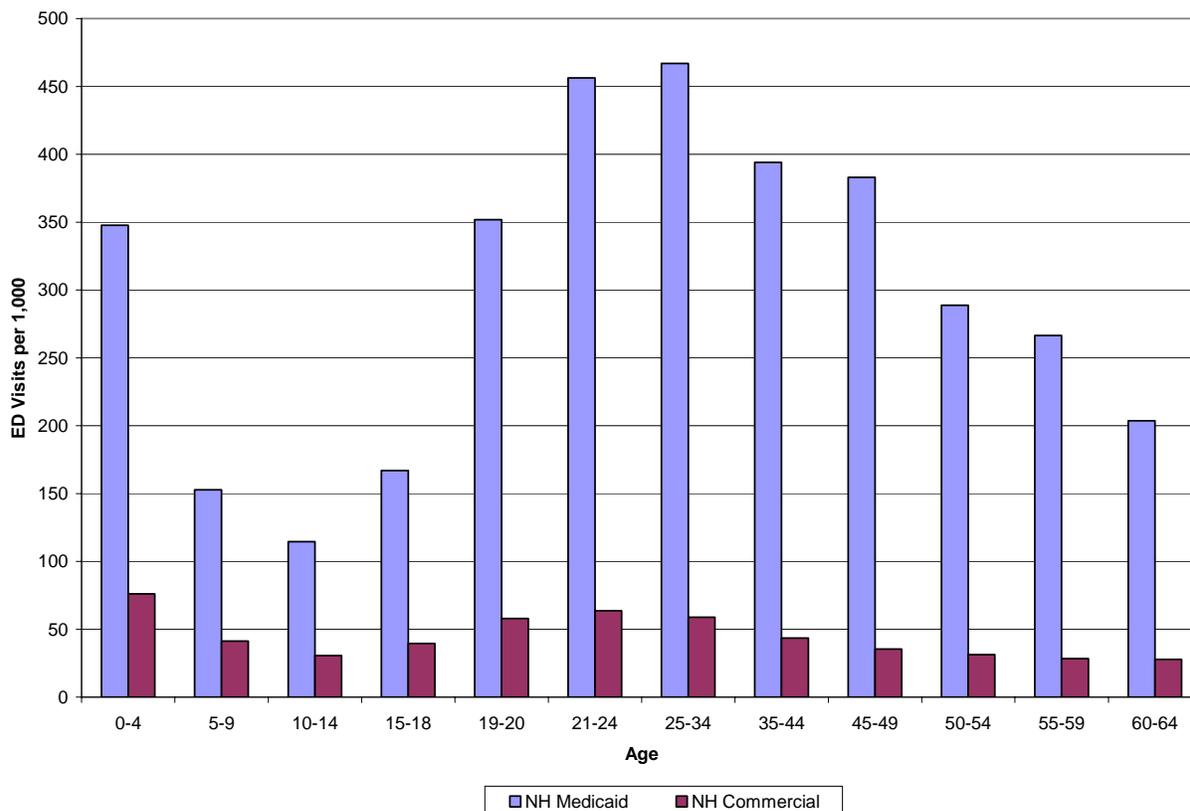
members. Among NH Medicaid members who visited the hospital ED with external and middle ear infections (acute or unspecified), 15% visited multiple times during the year for this condition, compared to 6% in the NH commercial population. For every selected condition studied, NH Medicaid members were more likely to have repeat ED visits for the same condition during the year compared with NH commercial members.

Overall, NH Medicaid ED visit rates per 1,000 members for each of these selected conditions were consistently higher than NH commercial. The ED visit rate for upper respiratory conditions for NH Medicaid (52.1 per 1,000) was 6 times the rate for NH commercial (8.6 per 1,000).

The ratio of ED to office-clinic visits was also higher in NH Medicaid compared with NH commercial. For upper respiratory conditions, NH Medicaid members incurred 5,476 ED visits and 30,217 office-clinic visits, a ratio of 0.18. For the same diagnostic condition, the NH commercial members incurred 4,649 ED visits and 105,925 office-clinic visits, a ratio of 0.04. Therefore, the NH Medicaid members were more than 4 times ( $0.18 / 0.04$ ) as likely to use the hospital ED instead of an office or clinic for treatment of upper respiratory infections compared to the NH commercial population.

For the selected diagnoses, rates of ED visit were consistently higher for NH Medicaid compared to NH commercial. For example, for children age 0-4, the NH Medicaid rate (348 per 1000 members) was 4.6 times the NH commercial rate (76 per 1,000). The variance between the NH Medicaid and NH commercial rates was different for children compared to adults. For these selected conditions, NH Medicaid adults, age 19-64, had an ED visit rate (389 per 1,000) that was 9.2 times the rate for NH commercial adults (42 per 1,000). By contrast, NH Medicaid children, age 0-18, had an ED visit rate (202 per 1,000) that was 4.5 times the rate for NH commercial children (44 per 1,000). This indicates that for these selected conditions, the variance between NH Medicaid and NH commercial ED use rates is greater in adults than children.

**Figure 3. Emergency Department Visit Rates by Age for Selected Diagnoses: Medicaid Compared to NH Commercial Members, 2005**



Of the 25,600 ED visits for these selected diagnoses, 6,658 were among children age 0-4. In total, children age 0-18 represented 13,287 (52%) of these visits. However, since children represent 63% of NH Medicaid covered members, the actual use rate for these selected conditions for children was lower than adults.

Variations in ED and office-clinic visits for the subset of selected diagnoses were found by the HAA of the member's residence. These variations showed similar patterns to the combined ED results presented in Table 3 earlier. Laconia had the highest ED visit rate in NH Medicaid (529 per 1,000) and NH commercial (99 per 1,000) and the highest ratio of ED to office-clinic visits (0.47 and 0.14). For both NH Medicaid and NH commercial populations, lower ED visit rates were found for these selected diagnoses in southern NH HAAs (Peterborough, Keene, Exeter, Derry, Manchester, and Nashua) while northern areas of NH had higher rates.

## DISCUSSION AND NEXT STEPS

Using administrative eligibility and claims data, this study described outpatient hospital ED use in the NH Medicaid and NH commercial populations. Outpatient hospital ED use was contrasted with office-clinic visit use. Finally, a method was developed to identify 15 diagnostic groups that had high ED use, were least likely to have ED visit resulting in inpatient hospitalization, and were more likely to have treatment provided in the office-clinic setting.

Our results indicate that NH Medicaid members are frequent users of the hospital ED for outpatient service. During 2005, 41,296 (39%) of NH Medicaid members used the ED and 18,145 had multiple ED use during the year, and these multiple ED users accounted for 73% of all NH Medicaid ED use. By contrast, we identified that the NH commercial population had much lower ED use. NH Medicaid members had 4.4 times the rate of ED use compared to NH commercial members. This ratio is higher than the ratio based on the CDC report which indicates that nationally Medicaid use is 4.0 times the rate for persons with private commercial insurance (803 vs. 203 per 1,000).<sup>1,t</sup>

Overall, the ratio of outpatient hospital ED visits to office-clinic visits was 3.1 times higher among the NH Medicaid population compared to the NH commercial population. While NH Medicaid likely covers a population with more disease burden, our metric computing the ratio of ED and office-clinic visit suggests a different pattern of care setting for illness compared to the NH commercial population.

While NH Medicaid covers a large proportion of children, which contributes to ED use, our study revealed that ED use rates per member covered were higher among NH Medicaid adults compared with children. Furthermore, the variance above NH commercial ED use rates was higher among Medicaid adults compared to Medicaid children.

Fifteen diagnostic groups selected for special study (e.g. upper respiratory, ear infection, low back pain) contributed to 25,600 (almost 30%) of total 86,989 NH Medicaid ED visits. These ED visits represent ED visits that may be most likely to be (although not always) treatable in a primary care office or clinic setting. The ED visit rate for these conditions was 5.7 times higher in the NH Medicaid population compared to the NH commercial rate. This indicates that even for conditions that might be non-urgent or primary care treatable, NH Medicaid members use the ED at significantly higher rates.

We found significant variation in NH Medicaid and NH commercial ED rates by the geographical area (Health Analysis Area) of the member's residence. Southern NH areas had lower ED rates compared to northern NH in both the NH Medicaid and commercial populations. Paradoxically, while the highest relative rates of ED use are found in northern NH, the highest volume of ED use is found in southern NH where the majority of the population resides. This may have implications for any strategies to reduce the ED use rate. The north-south difference in rates of ED use is not unique to NH Medicaid. A similar study of Maine Medicaid (MaineCare) demonstrated lower rates in the southern area of the state compared to rural northern and eastern areas.<sup>3</sup>

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).<sup>4</sup> National data indicate that 10% 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.<sup>5,6</sup> The results of our study are suggestive that NH Medicaid members are more likely to use the hospital ED as a usual source of care.

Perceived access barriers to usual source of care have been associated with increased non-urgent ED use and increased access to primary care has been associated with decreased ED use.<sup>7,8,9</sup> In one study of children using the ED for non-urgent problems, providing the family with follow-up information about the importance of a primary care provider and assistance with making an appointment, reduced non-urgent ED use by 11.1% to 14.5% during the 6 months after the intervention.<sup>10</sup>

The results of this study suggest opportunities to reduce NH Medicaid ED use for non-urgent and primary care treatable conditions.

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## Next Steps

A high proportion of ED use in NH Medicaid was due to members who had multiple ED visits and some of these ED users had no physician office or clinic visit during the year. This suggests opportunities to develop an additional study of NH Medicaid members who use the hospital ED as their primary source of care. NH Medicaid members who use the hospital ED and do not use physician office visits or clinics may also have lower rates of preventive service that may contribute to long term higher cost.

This additional study would include development of an algorithm to identify a group of frequent NH Medicaid ED users from the claims data. By contrasting these frequent ED users to other members using a variety of metrics (age, gender, eligibility category, diagnostic profile, diagnostic reason for ED use, use of preventive and other services, geographical variation in access to primary care physicians, and total cost), a more complete picture of the causes of frequent ED use can be developed. The benefits to identifying and reducing the frequent ED user population in NH Medicaid population may go beyond the payments associated with treatment in the hospital ED setting. These benefits may include increased access to preventive services and long-term reductions in total cost.

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# APPENDICES

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## Appendix 1: Emergency Department Use in New Hampshire: Study Methods

This study was based on administrative eligibility and claims data from New Hampshire Medicaid and the NH CHIS commercial data bases for the calendar year 2005 (based on date of service).

**1. NH Medicaid Eligibility Groupings.** Aggregated enrollment groupings based on the Medicaid program they were eligible for (Appendix 3 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.

**2. NH Medicaid Health Analysis Areas.** Aggregation of zip codes based on New Hampshire Medicaid Health Analysis Areas (HAA) for NH Medicaid enrollees was utilized (Appendix D). Health Analysis Areas are based on a plurality of patients seeking care at hospitals for non-specialty hospital services. Health Analysis Area are more relevant to how health care is delivered in NH compared to counties.

**3. Age Groupings.** Age groupings of interest were defined by New Hampshire DHHS as 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, 85 and older. The cutoff at age 18 is requested by New Hampshire DHHS and corresponds to the definition of child for Medicaid eligibility purposes.

**4. 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.

**5. Emergency Department Visit Definition.** This study focused on outpatient hospital emergency department visits. Emergency department visits were selected based on UB revenue codes 0450-0459 or CPT codes 99281-99285. Visits resulting in inpatient hospitalization were excluded by using Medicaid category of service codes 1,3,103. Our definition includes revenue code 0456 hospital urgent-center visits which are sometimes excluded from other studies.

**6. Office/Clinic Visit Definition.** Office or Clinic visits were identified were selected based on CPT codes:

99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99354, 99355, 99381, 9938299383, 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.

**7. Payments.** For the Medicaid and commercial populations we determined the claim payments to the provider from the data in the administrative claim files. Once the ED or Office/Clinic visit was identified then we combined the payments for all services on the claim. Therefore, if a member visited the ED and the claim included the ED room service charge, a radiological diagnostic test, and a lab test, the payments for all of these services were considered. The same method was applied to the office/clinic visits. NH Medicaid or commercial payers 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.

**8. 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.

**9. Reporting Metrics.** We tracked the following statistical measures for this report.

- Average members covered during year (member months / 12)
- Members with any ED visit
- Members with repeat ED visits during same year and percentage
- Number of ED visits and rate per 1,000 members covered
- ED visit payments and average payment per visit
- Members with any office or clinic visit and percentage
- Number of office or clinic visits and rate per 1,000
- Office or clinic visit payments and average payment per visit
- Ratio of ED to office or clinic visits

**10. Identification of special study discharge diagnosis codes.** An important component of this study was to focus on ED use for certain diagnoses. We were interested in diagnoses that might have high volume but also have the greatest likelihood of being preventable or

treatable in the primary care setting. While definitions of preventable or “ambulatory care sensitive” conditions are available for the analysis of variation in inpatient care, appropriate definitions for outpatient emergency department use are lacking. We determined a set of diagnosis based on empirically reviewing the NH Medicaid and commercial administrative ED claims data by individual ICD-9-CM diagnosis code and the following criteria.

- Diagnosis is non-injury
- Diagnosis is not dental, dental data is incomplete in the commercial data
- High ED volume
- ED visit 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
- Clinical review of the ICD-9-CM codes selected.

Examples of ICD-9-CM coding and NH Medicaid and commercial data used in the decision process are provided below. For unspecified otitis media, ICD-9-CM 382.9, the likelihood of inpatient hospitalization from the ED was low in the Medicaid (0.03%) and commercial (0.11%), the average ED payment was relatively low in the Medicaid (\$105) and commercial (\$105), and the percentage of total encounters treated in the office-clinic setting was relatively high in the Medicaid (77%) and commercial (92%) populations. This suggests that otitis media is a condition that is less likely to require hospital treatment if office-clinic treatment is available. This condition was selected for special study. In contrast, for pneumonia, organism unspecified, ICD-9-CM 486, the likelihood of inpatient hospitalization from the ED was relatively high in the Medicaid (26.10%) and commercial (23.05%), the average ED payment was relatively high in the Medicaid (\$250) and commercial (\$698), and the percentage of total encounters treated in the office-clinic setting was relatively lower in the Medicaid (57%) and commercial (83%) populations. This suggests that pneumonia is a condition that is more likely to require hospital emergency care often resulting in hospitalization. This condition was rejected for special study.

#### Examples of Data Utilized to Select or Reject Discharge Diagnoses for Special Study

ICD-9-CM	Description	% of ED Visits Resulting in Inpatient Hospitalization	Average Outpatient ED Visit Payment	% of Total Encounters in the Office-Clinic Setting
<b>Example Diagnoses selected for special study</b>		<b>NH Medicaid Data</b>		
382.9	Unspecified otitis media	0.03%	\$105	77%
465.9	Acute upper respiratory infection, unspecified site	0.25%	\$113	84%
724.2	Lumbago	1.08%	\$140	79%
<b>Example Diagnoses rejected for special study</b>				
491.21	Obstructive chronic bronchitis with acute exacerbation	30.36%	\$207	35%
786.50	Chest pain unspecified	3.55%	\$320	61%
486	Pneumonia, organism unspecified	26.10%	\$250	57%

ICD-9-CM	Description	% of ED Visits Resulting in Inpatient Hospitalization	Average Outpatient ED Visit Payment	% of Total Encounters in the Office-Clinic Setting
	<b>Example Diagnoses selected for special study</b>	<b>NH Commercial Data</b>		
382.9	Unspecified otitis media	0.11%	\$105	92%
465.9	Acute upper respiratory infection, unspecified site	0.41%	\$162	96%
724.2	Lumbago	2.33%	\$399	94%
	<b>Example Diagnoses rejected for special study</b>			
491.21	Obstructive chronic bronchitis with acute exacerbation	40.64%	\$920	69%
786.50	Chest pain unspecified	3.54%	\$1,214	82%
486	Pneumonia, organism unspecified	23.05%	\$698	83%

Upon clinical review, some additional “adjacent” ICD-9 codes that were lower volume were added to the codes selected. This process resulted in the following 15 groups of ICD-9-CM codes into diagnostic condition groups for special study (Appendix B).

- 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 (unspecified) 493.90
- 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 we cannot assess the appropriateness of any specific use of the hospital outpatient ED 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.

There are some limitations in the rate comparisons made in this report. Detailed examination of the NH commercial data revealed that 16% of the members were covered by Indemnity plans (fee-for-service, TPAs). For the members in the Indemnity plans the ED visit rate (97 per 1,000) and office-clinic visit rate (1,263 per 1,000) was one-third of the rate for the members in the HMO-EPO, Point-of-Service, and Preferred Provider plans. This could be due to the benefit structures of these plans; claims may not be submitted or paid due to deductibles. This could also be due to poor quality of coding of the procedure codes required to identify ED and office-clinic visits in these plans. Secondly, age was limited to age 0-64 in the NH commercial data; however, the NH Medicaid data included 9% of members that age 65 or older. These older members were included as part of standard reporting rules for NH Medicaid. Medicare data is not available and we cannot evaluate the completeness of data for NH Medicaid members age 65 and older. We evaluated the impact of this on our reporting of the differences between NH Medicaid and NH commercial rates (see table below). Our original results show that NH Medicaid has an ED visit rate 4.5 times higher than NH commercial, a revised estimate shows a rate 4.0 times higher; for office-clinic visits the rate was 1.4 times higher and the revised estimate is 1.3 times higher. Thus, while a significant difference between NH Medicaid and NH commercial exists, the data prepared for this report overestimates the differences to some degree.

	<b>ED Visits per 1,000</b>	<b>Office-clinic visits per 1,000</b>
<b><i>Included In Report</i></b>		
NH Medicaid, All Ages	828	4,530
NH Commercial, 0-64 Total	188	3,158
Ratio Medicaid / Commercial	<b>4.4</b>	<b>1.4</b>
<b><i>After Exclusions</i></b>		
NH Medicaid, Age 0-64	845	4,599
NH Commercial, Age 0-64 Excluding Indemnity	211	3,514
Ratio Medicaid / Commercial Revised Estimate	<b>4.0</b>	<b>1.3</b>

## Appendix 2: New Hampshire Medicaid Special Diagnosis Groupings

Group	Group Name	ICD-9	DESCRIPTION
1	Sore throat (Strep)	034.0	STREPTOCOCCAL SORE THROAT
2	Viral Infection (unspecified)	079.99	VIRAL INFECTION NOS
3	Anxiety (unspecified or generalized)	300.00	ANXIETY STATE, UNSPECIFIED
3	Anxiety (unspecified or generalized)	300.02	GENERALIZED ANXIETY DISORDER
4	Conjunctivitis (acute or unspecified)	372.00	UNSPECIFIED ACUTE CONJUNCTIVITIS
4	Conjunctivitis (acute or unspecified)	372.30	UNSPECIFIED CONJUNCTIVITIS
5	External and middle ear infections (acute or unspecified)	380.10	UNSPEC INFECTIVE OTITIS EXTERNA
5	External and middle ear infections (acute or unspecified)	381.00	UNS ACUT NONSUPPRATV OTITIS MEDIA
5	External and middle ear infections (acute or unspecified)	381.01	ACUTE SEROUS OTITIS MEDIA
			NONSUPPRATV OTIT MEDIA NOT
5	External and middle ear infections (acute or unspecified)	381.4	AC/CHRN
			ACUT SUPPURATIVE OM W/O RUP
5	External and middle ear infections (acute or unspecified)	382.00	EARDRUM
5	External and middle ear infections (acute or unspecified)	382.9	UNSPECIFIED OTITIS MEDIA
6	Upper respiratory infections (acute or unspecified)	461.9	ACUTE SINUSITIS, UNSPECIFIED
6	Upper respiratory infections (acute or unspecified)	473.9	UNSPECIFIED SINUSITIS
6	Upper respiratory infections (acute or unspecified)	462	ACUTE PHARYNGITIS
6	Upper respiratory infections (acute or unspecified)	465.9	ACUTE URIS OF UNSPECIFIED SITE
7	Bronchitis (acute or unspecified) and cough	466.0	ACUTE BRONCHITIS
7	Bronchitis (acute or unspecified) and cough	786.2	COUGH
			BRONCHITIS NOT SPEC AS
7	Bronchitis (acute or unspecified) and cough	490	ACUT/CHRONIC
			UNS ASTHMA W/O
8	Asthma (unspecified)	493.90	ASTHMATICUS/XACRBAT
9	Dermatitis and rash	691.0	DIAPER OR NAPKIN RASH
9	Dermatitis and rash	691.8	OTHER ATOPIC DERMATITIS
9	Dermatitis and rash	692.6	DERMATITIS DUE TO PLANT
9	Dermatitis and rash	692.9	DERMATITIS NOS
9	Dermatitis and rash	782.1	RASH&OTH NONSPECIFIC SKIN ERUPTION
10	Joint pain	719.40	PAIN IN JOINT, SITE UNSPECIFIED
10	Joint pain	719.41	PAIN IN JOINT, SHOULDER REGION
10	Joint pain	719.42	PAIN IN JOINT, UPPER ARM
10	Joint pain	719.43	PAIN IN JOINT, FOREARM
10	Joint pain	719.44	PAIN IN JOINT, HAND
10	Joint pain	719.45	PAIN IN JOINT PELVIC REGION&THIGH
10	Joint pain	719.46	PAIN IN JOINT, LOWER LEG
10	Joint pain	719.47	PAIN IN JOINT, ANKLE AND FOOT
10	Joint pain	719.48	PAIN IN JOINT OTHER SPECIFIED SITES
10	Joint pain	719.49	PAIN IN JOINT, MULTIPLE SITES
11	Lower and unspecified back pain	724.2	LUMBAGO
11	Lower and unspecified back pain	724.5	UNSPECIFIED BACKACHE
12	Muscle and soft tissue limb pain	729.1	UNSPECIFIED MYALGIA AND MYOSITIS
12	Muscle and soft tissue limb pain	729.5	PAIN IN SOFT TISSUES OF LIMB
13	Fatigue	780.79	OTHER MALAISE AND FATIGUE
14	Headache	784.0	HEADACHE
15	Abdominal pain	789.00	ABDOMINAL PAIN, UNSPECIFIED SITE
15	Abdominal pain	789.07	ABDOMINAL PAIN, GENERALIZED
15	Abdominal pain	789.01	ABDOMINAL PAIN, RIGHT UP
			ABDOMINAL PAIN, LEFT UPPER
15	Abdominal pain	789.02	QUADRANT
15	Abdominal pain	789.03	ABDOMINAL PAIN, RIGHT LO
			ABDOMINAL PAIN, LEFT LOWER
15	Abdominal pain	789.04	QUADRANT
15	Abdominal pain	789.05	ABDOMINAL PAIN, PERIUMBILIC
15	Abdominal pain	789.06	ABDOMINAL PAIN, EPIGASTRIC
15	Abdominal pain	789.09	ABDOMINAL PAIN, OTHER SP

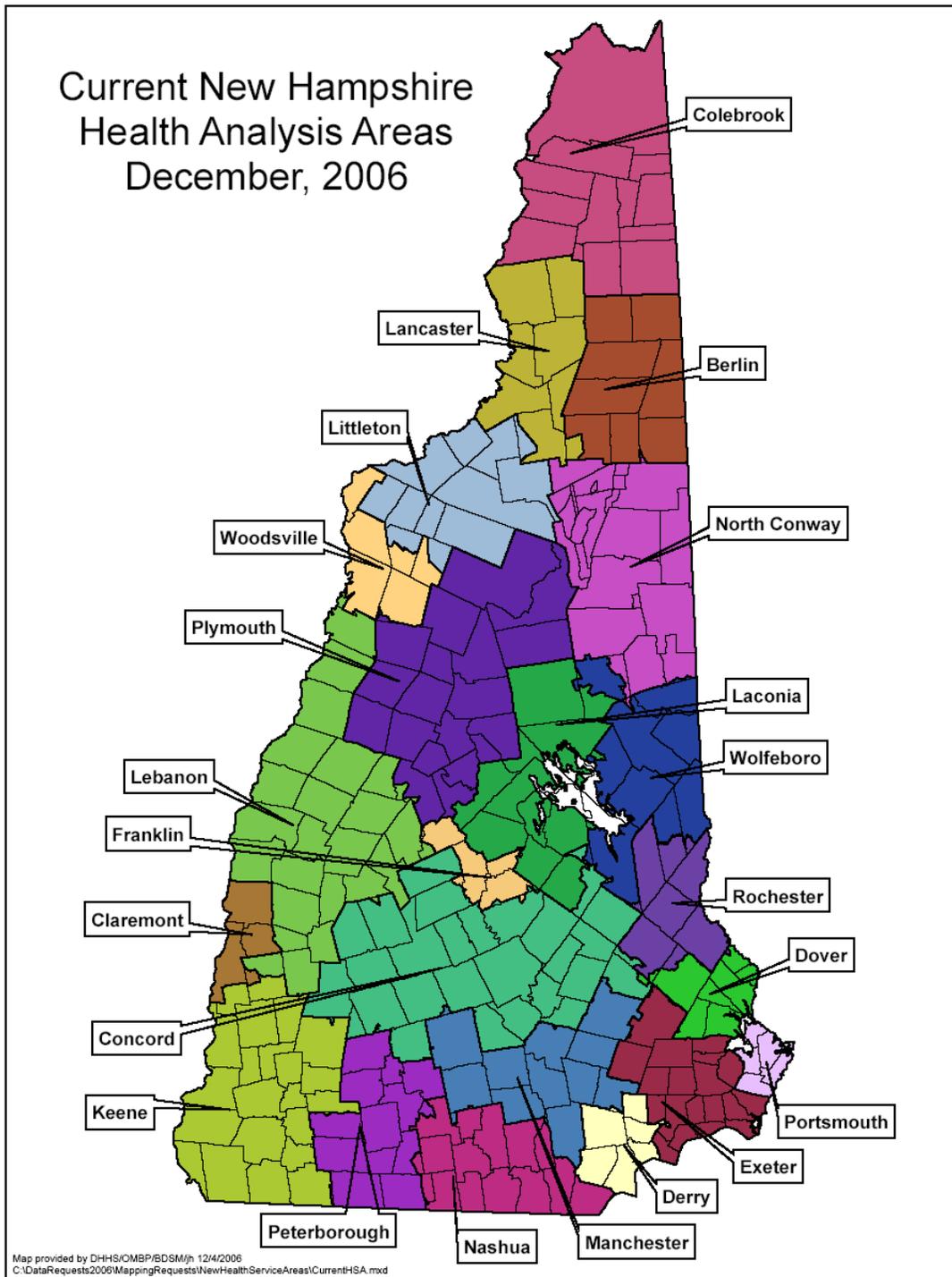
### Appendix 3: NH Medicaid Eligibility Collapsed Groupings

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	Full Medicaid	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 ADFC/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 4: Health Analysis Area Definitions



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

<b>New Hampshire Health Analysis Area</b>	<b>Zip Code</b>	<b>Zip Name</b>	<b>New Hampshire Health Analysis Area</b>	<b>Zip Code</b>	<b>Zip Name</b>
Keene	03607	South Acworth	Lebanon	03781	Plainfield
Keene	03608	Walpole	Lebanon	03782	Sunapee
Keene	03609	North Walpole	Lebanon	03784	West Lebanon
Laconia	03220	Belmont	Littleton	03561	Littleton
Laconia	03226	Center Harbor	Littleton	03574	Bethlehem
Laconia	03227	Center Sandwich	Littleton	03580	Franconia
Laconia	03237	Gilmanton	Littleton	03585	Lisbon
Laconia	03246	Laconia	Littleton	03586	Sugar Hill
Laconia	03247	Laconia	Littleton	03595	Twin Mountain
Laconia	03249	Gilford	Littleton	03598	Whitefield
Laconia	03253	Meredith	Manchester	03032	Auburn
Laconia	03254	Moultonborough	Manchester	03034	Candia
Laconia	03256	New Hampton	Manchester	03036	Chester
Laconia	03259	North Sandwich	Manchester	03037	Deerfield
Laconia	03269	Sanbornton	Manchester	03040	East Candia
Laconia	03289	Winnisquam	Manchester	03045	Goffstown
Laconia	03883	South Tamworth	Manchester	03053	Londonderry
Lancaster	00185	Kilkenny	Manchester	03070	New Boston
Lancaster	03582	Groveton	Manchester	03101	Manchester
Lancaster	03583	Jefferson	Manchester	03102	Manchester
Lancaster	03584	Lancaster	Manchester	03103	Manchester
Lancaster	03587	Meadows	Manchester	03104	Manchester
Lancaster	03590	North Stratford	Manchester	03105	Manchester
Lebanon	03230	Danbury	Manchester	03106	Hooksett
Lebanon	03231	East Andover	Manchester	03107	Manchester
Lebanon	03233	Elkins	Manchester	03108	Manchester
Lebanon	03240	Grafton	Manchester	03109	Manchester
Lebanon	03257	New London	Manchester	03110	Bedford
Lebanon	03260	North Sutton	Manchester	03111	Manchester
Lebanon	03273	South Sutton	Manchester	03281	Weare
Lebanon	03284	Springfield	Nashua	03031	Amherst
Lebanon	03287	Wilmot	Nashua	03033	Brookline
Lebanon	03601	Acworth	Nashua	03048	Greenville
Lebanon	03605	Lempster	Nashua	03049	Hollis
Lebanon	03741	Canaan	Nashua	03051	Hudson
Lebanon	03745	Cornish	Nashua	03052	Litchfield
Lebanon	03746	Cornish Flat	Nashua	03054	Merrimack
Lebanon	03748	Enfield	Nashua	03055	Milford
Lebanon	03749	Enfield Center	Nashua	03057	Mont Vernon
Lebanon	03750	Etna	Nashua	03060	Nashua
Lebanon	03751	Georges Mills	Nashua	03061	Nashua
Lebanon	03752	Goshen	Nashua	03062	Nashua
Lebanon	03753	Grantham	Nashua	03063	Nashua
Lebanon	03754	Guild	Nashua	03064	Nashua
Lebanon	03755	Hanover	Nashua	03076	Pelham
Lebanon	03756	Lebanon	Nashua	03082	Lyndeborough
Lebanon	03765	Haverhill	Nashua	03086	Wilton
Lebanon	03766	Lebanon	North Conway	00168	Beans Purchase
Lebanon	03768	Lyme	North Conway	00172	Hadleys Purchase
Lebanon	03769	Lyme Center	North Conway	00173	Cutts Grant
Lebanon	03770	Meriden	North Conway	00174	Beans Grant
Lebanon	03773	Newport	North Conway	00176	Sargents Purchase
Lebanon	03777	Orford	North Conway	00177	Pinkham Grant
Lebanon	03779	Piermont	North Conway	00179	Chandlers Purchase

<b>New Hampshire Health Analysis Area</b>	<b>Zip Code</b>	<b>Zip Name</b>	<b>New Hampshire Health Analysis Area</b>	<b>Zip Code</b>	<b>Zip Name</b>
North Conway	00180	Thompson/Meserves Purch	Portsmouth	03862	North Hampton
North Conway	00181	Low and Burbanks Grant	Portsmouth	03870	Rye
North Conway	00182	Crawfords Purchase	Portsmouth	03871	Rye Beach
North Conway	00183	Greens Grant	Rochester	03815	Center Strafford
North Conway	00184	Martins Location	Rochester	03835	Farmington
North Conway	03575	Bretton Woods	Rochester	03839	Rochester
North Conway	03589	Mount Washington	Rochester	03851	Milton
North Conway	03812	Bartlett	Rochester	03852	Milton Mills
North Conway	03813	Center Conway	Rochester	03855	New Durham
North Conway	03817	Chocorua	Rochester	03866	Rochester
North Conway	03818	Conway	Rochester	03867	Rochester
North Conway	03832	Eaton Center	Rochester	03868	Rochester
North Conway	03838	Glen	Rochester	03884	Strafford
North Conway	03845	Intervale	Rochester	03887	Union
North Conway	03846	Jackson	Wolfeboro	03809	Alton
North Conway	03847	Kearsarge	Wolfeboro	03810	Alton Bay
North Conway	03849	Madison	Wolfeboro	03814	Center Ossipee
North Conway	03860	North Conway	Wolfeboro	03816	Center Tuftonboro
North Conway	03875	Silver Lake	Wolfeboro	03830	East Wakefield
North Conway	03890	West Ossipee	Wolfeboro	03836	Freedom
Peterborough	03043	Francestown	Wolfeboro	03850	Melvin Village
Peterborough	03047	Greenfield	Wolfeboro	03853	Mirror Lake
Peterborough	03071	New Ipswich	Wolfeboro	03864	Ossipee
Peterborough	03084	Temple	Wolfeboro	03872	Sanbornville
Peterborough	03440	Antrim	Wolfeboro	03882	Effingham
Peterborough	03442	Bennington	Wolfeboro	03886	Tamworth
Peterborough	03444	Dublin	Wolfeboro	03894	Wolfeboro
Peterborough	03449	Hancock	Wolfeboro	03896	Wolfeboro Falls
Peterborough	03452	Jaffrey	Wolfeboro	03897	Wonalancet
Peterborough	03458	Peterborough	Woodsville	03238	Glenclyff
Peterborough	03461	Rindge	Woodsville	03740	Bath
Peterborough	03468	West Peterborough	Woodsville	03771	Monroe
Plymouth	03215	Waterville Valley	Woodsville	03774	North Haverhill
Plymouth	03217	Ashland	Woodsville	03780	Pike
Plymouth	03222	Bristol	Woodsville	03785	Woodsville
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			

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**Appendix 5: Hospital Emergency Department Visits by Health Analysis Area, 2005**

<b>Health Analysis Area</b>	<b>NH Medicaid Members</b>	<b>NH Medicaid ED Visits</b>	<b>NH Commercial Members</b>	<b>NH Commercial ED Visits</b>
Berlin	2,392	2,726	5,256	1,439
Claremont	2,831	3,121	6,926	1,713
Colebrook	755	758	1,780	391
Concord	10,577	8,781	69,058	12,863
Derry	4,414	3,013	27,675	4,733
Dover	4,995	5,588	26,035	5,068
Exeter	5,901	3,831	39,109	6,906
Franklin	2,351	3,022	8,515	2,665
Keene	5,307	2,833	25,074	3,920
Laconia	4,931	6,797	26,160	8,351
Lancaster	1,209	1,231	3,465	962
Lebanon	3,949	2,892	31,976	5,982
Littleton	2,180	1,680	6,589	1,362
Manchester	19,189	13,732	93,297	14,076
Nashua	12,778	9,451	79,718	13,357
North Conway	2,126	1,617	8,057	1,761
Peterborough	2,319	1,209	15,903	2,499
Plymouth	2,697	2,343	12,916	3,113
Portsmouth	2,123	1,893	15,176	2,757
Rochester	5,937	6,283	20,383	3,854
Wolfeboro	2,532	2,009	11,296	2,614
Woodsville	720	390	2,396	482

## Appendix 6: Emergency Department and Office-Clinic Visits for Selected Diagnoses, 2005

Selected Diagnostic Group	NH Medicaid			NH Commercial		
	Members Using Emergency Department	Members with Repeat Emergency Department Use (same diagnosis group)	Number of Emergency Department Visits	Members Using Emergency Department	Members with Repeat Emergency Department Use (same diagnosis group)	Number of Emergency Department Visits
Sore throat (Strep)	434	30	468	502	22	528
Viral Infection (unspecified)	1,265	66	1,341	874	12	888
Anxiety (unspecified or generalized)	425	58	527	388	25	418
Conjunctivitis (acute or unspecified)	656	19	676	612	13	628
External and middle ear infections (acute or unspecified)	3,453	502	4,200	2,337	135	2,527
Upper respiratory infections (acute or unspecified)	4,702	420	5,476	4,404	136	4,649
Bronchitis (acute or unspecified) and cough	2,296	178	2,598	2,288	70	2,400
Asthma (unspecified)	504	30	537	437	21	461
Dermatitis and rash	1,180	54	1,264	1,148	24	1,188
Joint pain	978	91	1,173	1,008	25	1,046
Lower and unspecified back pain	1,251	195	1,748	1,202	71	1,361
Muscle and soft tissue limb pain	683	56	761	736	28	771
Fatigue	268	18	286	233	4	237
Headache	921	151	1,244	1,389	121	1,616
Abdominal pain	2,801	317	3,710	3,758	130	4,193