

# TRENDS IN UTILIZATION AT MINNESOTA HOSPITALS AND PHYSICIAN CLINICS, 1990-2000

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# 1 Introduction

It's generally acknowledged that two underlying forces are accelerating health care premiums, the insurance underwriting or premium cycle, and higher underlying health care costs.<sup>1,2,3</sup> Factors driving higher underlying costs include, but aren't limited to: increasing labor costs, advances in medical technology, growth in overall inflation, and the increasing use of medical goods and services. The purpose of this report is to examine changes in the patterns of key health services utilization in Minnesota over the past decade. It describes trends in the use of the highest cost medical services and presents either publicly available Minnesota-specific data or substitutes national data in the absence of state information. Of primary interest are how changes in population size and age influence trend volume variation in the use of hospital acute inpatient care, hospital outpatient and emergency department visits, and physician office visits.

Overall, the study finds that:

- There has been an increase in the number of hospitalizations in the state, but this was primarily the result of population growth through in-migration into the state, not the aging of Baby Boomers.
- Despite an increasing number of hospitalizations, patient day volume in Minnesota during 2000 was still below that of 1990, as a result of a decade long decline in average length of stay.
- The Post WWII Baby Boom continues to age, but by 2000, that aging has not added to the overall patient day volume, yet.
- Growth in health care utilization has occurred through a significant shift in the site of health care delivery away from inpatient settings to ambulatory settings.
- Hospital-based outpatient care in Minnesota was a likely source of major growth in health care use in the state with an increased volume of ambulatory surgeries (42%), all other outpatient services (33%), and emergency department visits (15%) between 1993 and 2000.

Rough estimates suggest that there were 2.3 million more physician office visits made by state residents in 2000 than in 1990 with 6% of the change due to more frequent visits and 12% due to population growth.

Another key finding is that ambulatory care has been increasingly substituted for, or used in complement with hospitalizations. Managed care, in particular, has fostered the substitution of ambulatory for inpatient care leading to a decline in inpatient acute care use and a corresponding rise in ambulatory care delivery.

The report begins by examining trends in hospital acute care use, and then analyzes trends in the use of hospital outpatient services and emergency services. Analyses of trends in the use of physician services, followed by a consideration of substituting ambulatory care for inpatient care conclude the report.



## 2

# The Predominance of Demographic Factors

Research has consistently shown that the two most reliable predictors of patients' health services utilization, especially hospital inpatient acute care, remain age and gender.<sup>4</sup> In general, as people age, the more numerous and more serious health problems become. Consistent with this, the prevalence of chronic conditions increases with age, but surprisingly, the incidence of acute conditions declines with it. For example, younger age cohorts experience high rates of respiratory conditions and injuries, while the elderly are relatively free of these.

Improvements in the health status of seniors since the enactment of Medicare, plus advances in medical technology and new pharmaceuticals, brought with them major changes in the age-graded need for hospital care. Pol and Thomas note that, the largest jump in hospital admissions for seniors took place historically at the 60 to 65 year age break, but in the late 1980s, age 70 and older became the breakpoint.<sup>5</sup> They further observe that patients in the older age cohorts traditionally preferred the safety of hospitalization, but with the establishment of managed care and its aim to prevent utilization of inpatient care, that preference is changing. Thus, while it is true that aging generally brings more numerous and severe health problems, research reveals that populations' experiences are much more complex and unexpected than may otherwise be thought. Age, therefore, is a key variable in understanding the complex dynamics of a population's care use, but the size of a population's age cohorts also play a significant role in the volume of health services use. That changes in both population size and the size of age cohorts within play a major role in the volume of health care utilization in both Minnesota and the United States is the central thesis of these analyses. The report begins by describing hospital inpatient utilization trends.



# 3 Hospital Inpatient Services

Figure 1

Minnesota Trends in Hospitalization, Average Length of Stay, and Patient Days



Data Source: MDH Health Care Cost Information System.

Note: Minnesota Hospitalizations are measured as number of admissions.

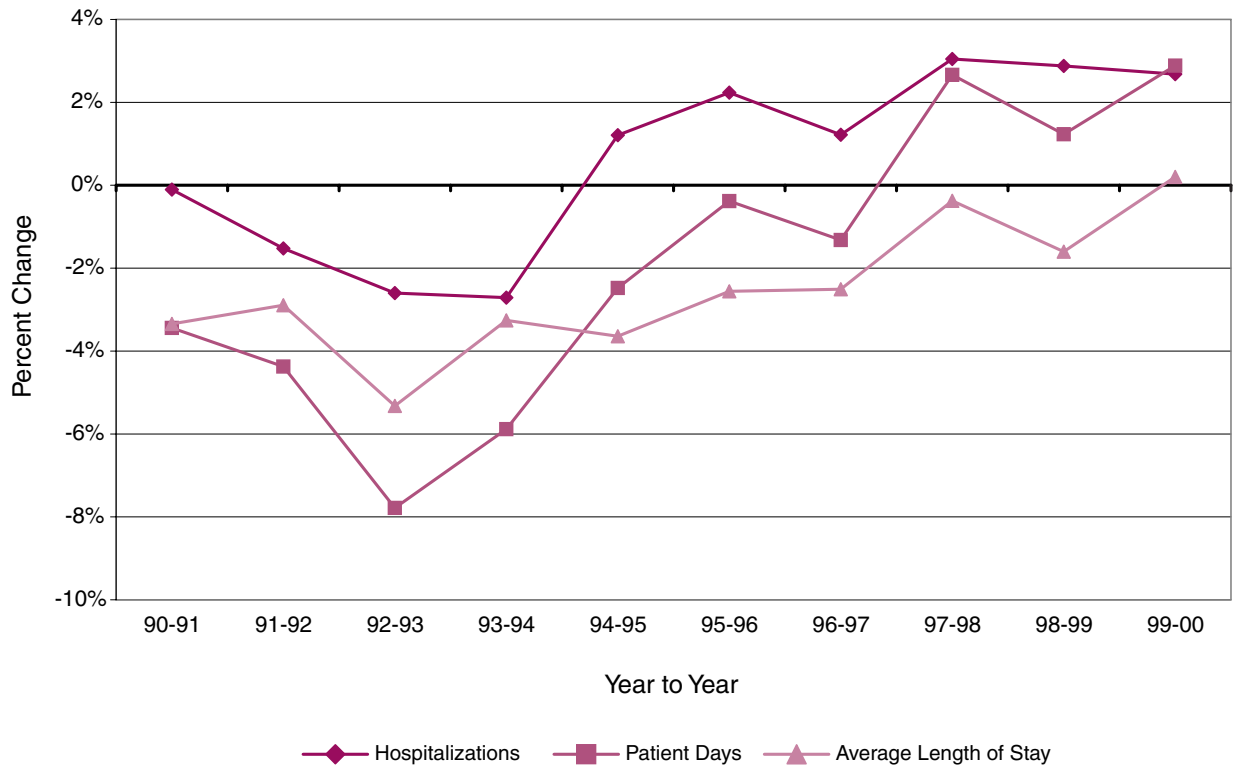
## Minnesota Utilization Trends

There are many different ways that hospital utilization can be measured. Perhaps the measure most relevant for health care insurance premiums is the number of *patient days* of care. The number of patient days produced by a hospital is a function of the number of patient hospitalizations (admissions) and how many days patients stay prior to discharge. Figure 1 shows that Minnesota hospitals provided 3,003,292 patient days of care in 1990. After declining through 1997, the number of days began rising again to 2,467,062 in 2000. Though rising through 2000, total patient days in 2000 were still 18% below that of 1990. Correspondingly, the number of hospitalizations rose from

518, 489 in 1990 to 550,946 in 2000, a 6% increase. But, as can be seen from these statistics, increased hospitalizations alone did not necessarily translate into higher patient day volumes. The number of days stayed in hospital and the intensity of care were the major cost drivers of an inpatient episode of care.

Figure 2

Percent Change in Minnesota Hospitalizations, Patient Days, and Average Length of Stay



Data Source: MDH Health Care Cost Information System

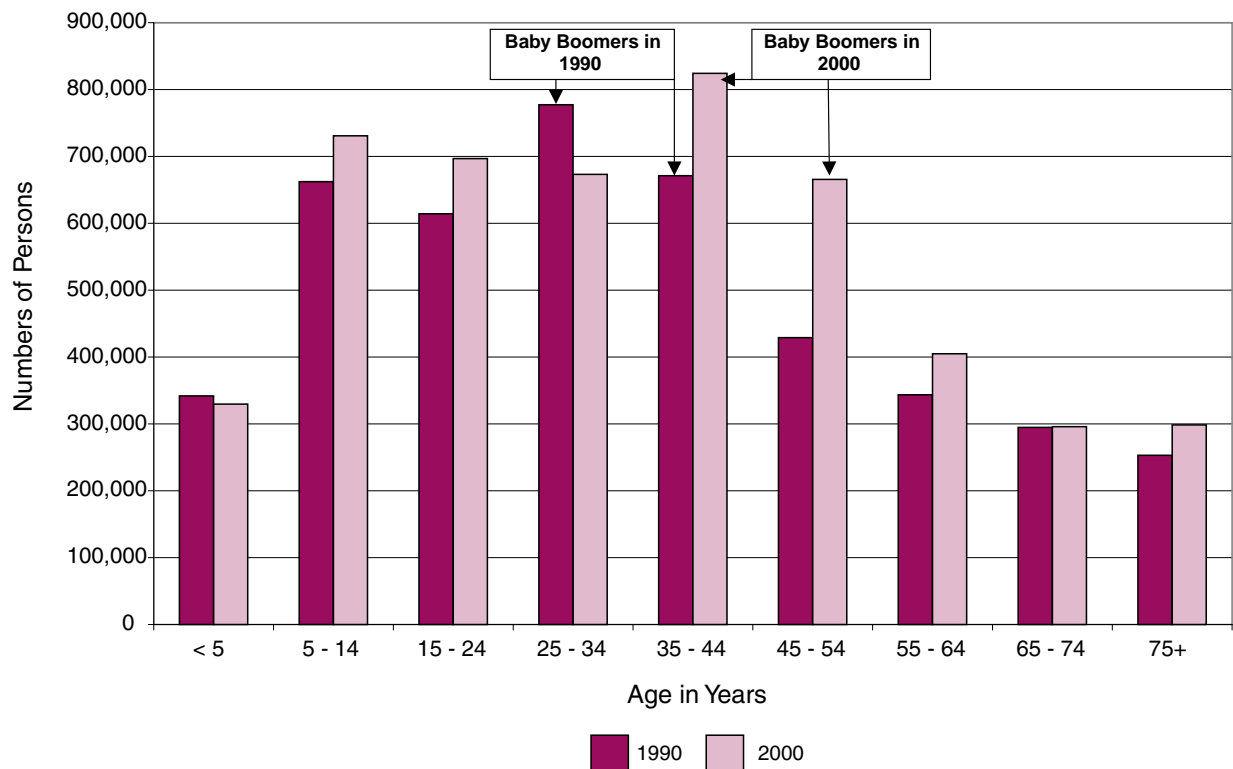
Figure 2 shows that variation over time in Minnesota’s patient days resulted from the complex interplay of changes in both the number of hospitalizations and average length of stay. From 1990 thru 1994, declines in both hospitalizations and length of stay resulted in a precipitous drop in patient days. From 1995 through 1999, average length of stay continued to drop, while the number of hospitalizations rose. In terms of patient days, the decline in length of stay during this time period was sufficient to offset the increase in hospitalizations, resulting in a drop in overall patient days. Average length of stay ceased its tumble between 1999 and 2000, ending with a slight positive increase for the first time in a decade. There were several fundamental factors at work in Minnesota during the decade that influenced these trends, but perhaps two of the most significant factors were: a major state health policy initiative that limited rates of health care revenue growth within the Minnesota; and, a significant shift in the state’s demographic characteristics.

## Demographic Change and Health Care Use

Population size, concentration, and geographic distribution each play a significant role in the demand for health services, but a population's demographic composition is also influential. Age, for example, corresponds not only with the levels of health care consumed, but also with the types of services used, and the circumstances under which they are provided.<sup>6</sup> Typically, there are a number of health problems associated with each age cohort within a population. Childbirth is an obvious example for many women 15 to 44 years of age. It's children that receive the majority of tonsillectomies, adenoidectomies, and myringotomies. Those admitted for chemical dependency treatment tend to be in the 20 to 35 year age range, while two of the most frequent reasons for hospitalization for persons under 15 are acute respiratory and digestive symptoms. In the 45 to 64 year and 65 years plus age groups, heart disease and cancer are the most prevalent conditions. Age is also related to income, education, lifestyle, living conditions, health beliefs, and marital status, which influences health behaviors and care use. Increases or decreases in the size of particular age cohorts, then, can dramatically alter health care utilization patterns. Enter the Post World War II Baby Boom Generation, the largest demographic cohort of the twentieth century.

Figure 3

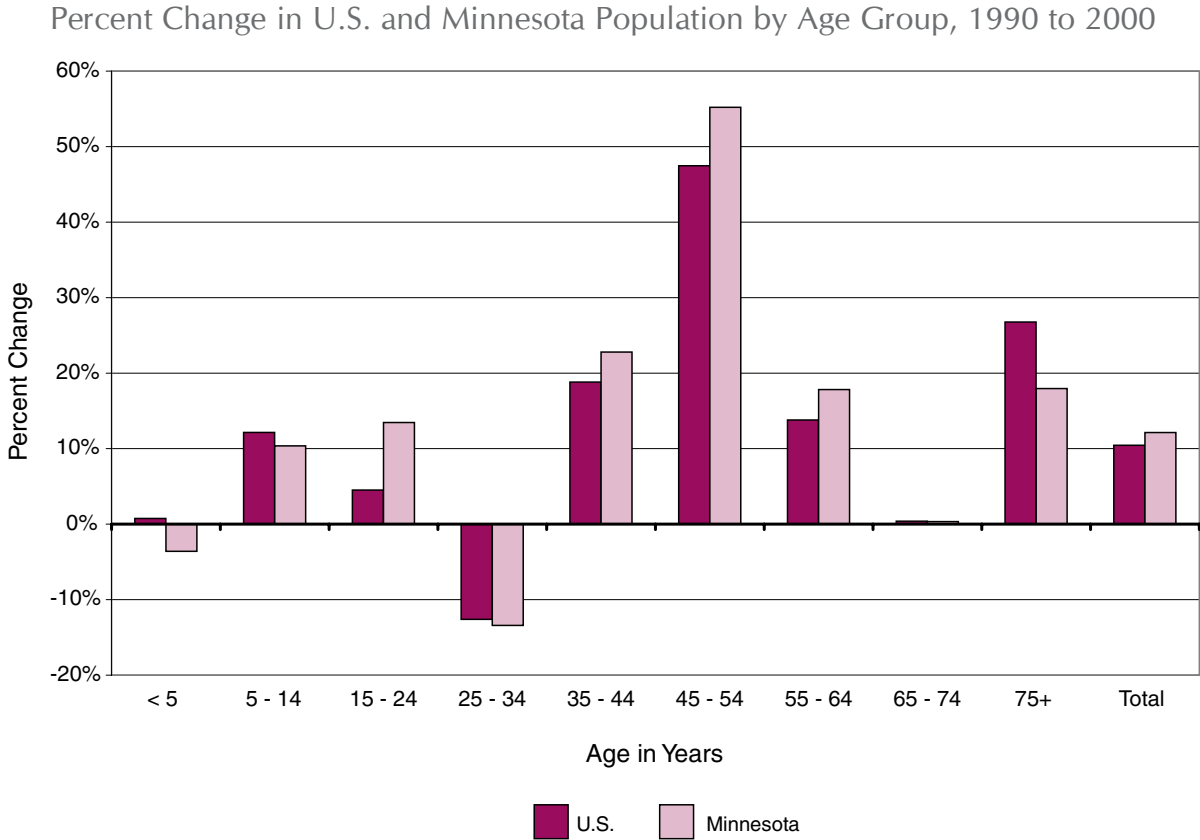
Minnesota Population Size by Age Group, 1990 versus 2000



Data Source: U.S. Census, July 1 estimates of Minnesota population.

During 1990, those born from 1946 to 1964 (the Baby Boom cohort span) ranged in age from 26 to 44 years. Figure 3 shows the sheer size of this age cohort in Minnesota during 1990, totaling 1,445,827 people, or 33% of the state’s total resident population. In 2000, when the cohort age ranged from 36 to 54 years in age, the Census counted 1,489,878 people, an increase of 3% in size, but now accounting for 30% of the state’s total resident population.

Figure 4



Data Source: U.S. Census, July 1 estimates of U.S. and Minnesota populations.

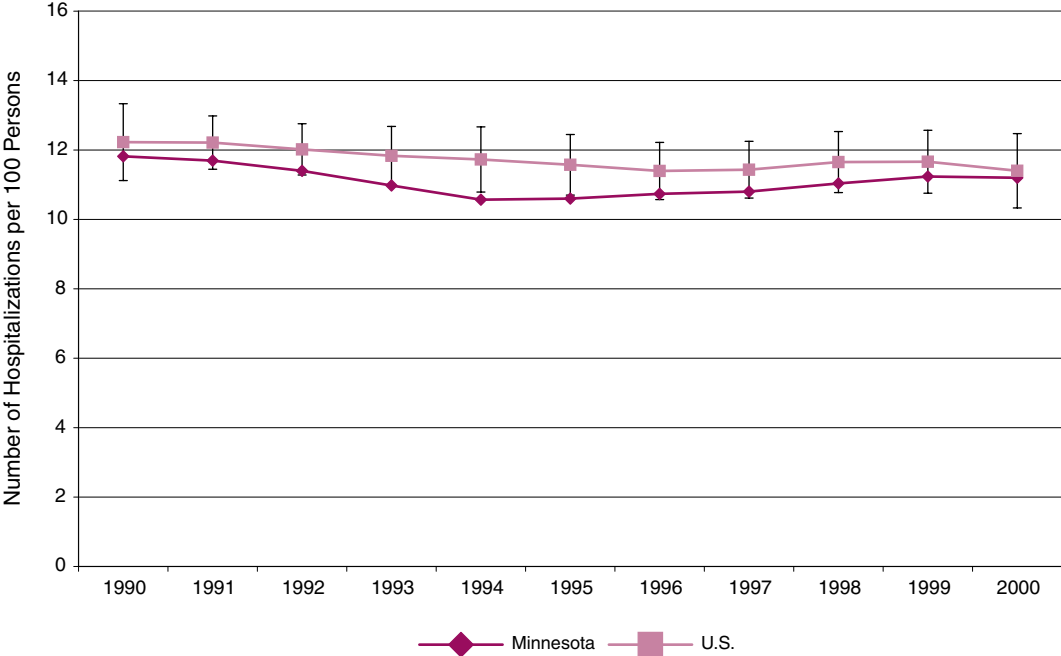
The 2000 Census also found that Minnesota’s overall population grew by 12.4%, gaining more than half a million new residents between 1990 and 2000. Key to understanding the impact of this change upon hospital utilization lies in appreciating not only the reported overall increase in population size but the dynamics of a changing age distribution as well. Fifty-three percent of the state’s population growth during the decade, according to the State Demographic Center, was accounted for through natural population increase. This means there were more births than deaths in the state, while the remaining 47% was the result of in-migration, or people moving into Minnesota from other states and countries.<sup>7</sup> The largest net in-migration to the state was among the 5 to 19 year and 25 to 44 year age groups. Thus, while natural increase added to the youngest age group through births, in-migration swelled not only the size of age groups for children and adolescents but those in the prime childbearing years as well.

Viewing the population change between decades as a whole, Figure 3 displays how Minnesota’s population was distributed across age groups and contrasts 1990 with 2000. Figure 4 documents the decennial change and compares it to the nation as a whole. Most noticeable was the large change for the 45 to 54 year old age group. This change reflects the first ten-year segment of the twenty-year Baby Boom cohort moving into the 45 to 54 year old age group, which was much smaller in 1990 when the Boomers were ten years younger. Minnesota’s increase for that age group was larger than that of the U.S. because the first ten-year segment of Baby Boomer cohort constituted a slightly larger proportion of the total state population than at the national level. Notice, from Figure 3, that the second ten-year segment of the generational cohort was larger than the first (those 35 to 44 years versus those 45 to 54 years in 2000). Shifts like these dramatically demonstrate the future impact of an aging generational cohort this size.

More importantly for hospital use, Figure 4 shows that the state’s middle-age population grew faster than the nation while the growth of the Minnesota senior population lagged behind the U.S. There was little change in the number of persons 65 to 74 years of age, but there was an 18% increase among those 75 years and over in Minnesota compared with a 27% increase nationally. The youngest senior cohort in Minnesota, those 65 to 74 years increased in size less than half of a percent. Minnesota also experienced a substantial increase in young people 15 to 24 years, a 15.5% advance for the state versus 4.5% for the U.S. This represents the aging of some of the Baby Boomers children plus the addition of in-migrants to the state mentioned above. There was a large decline in the size of the population ages 25 to 34 years between 1990 and 2000, primarily due to the Baby Boomers moving up the age distribution.

Figure 5

Minnesota and U.S. Trends in Hospitalization Rates, 1990 - 2000



Data Sources: MDH Health Care Cost Information System; National Hospital Discharge Surveys; U.S. Census, July 1 population estimates.  
 Note: Hospitalizations measured as number of admissions in MN, number of discharges in U.S.  
 U.S. Confidence interval at 95%.

## Hospital Utilization Rate Trends

Figure 5 exhibits Minnesota's trend in number of hospitalizations (admissions) per 100 persons between 1990 and 2000 in comparison with that of the U.S. (discharges).<sup>a</sup> Note that to disentangle health care use patterns from the confounding influence of changes or differences in population size, this study standardizes rates of hospitalization and patient day use to a common denominator in order to make comparisons across time and geography.<sup>b</sup>

In general, there has not been wide variability in overall hospitalization rates in Minnesota or the U.S. over the decade. The trend lines of both geographies remain within a narrow band of 12.2 to 11.2 hospitalizations per 100 persons. Minnesota's hospitalization rate has historically tended to track slightly below that of the U.S., but the national and state data points nearly coincided in 2000.<sup>c</sup> The only year that Minnesota's hospitalization rate exhibited a statistically significant difference from the U.S. rate was in 1994. The U.S. hospitalization rate appears to have slowly declined over the decade, reaching a low point in 2000, but there were no statistically significant differences across time.

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<sup>a</sup> At the time of this analysis, Minnesota reliably collects only an annual census of all hospital admissions. While a sample of hospital discharge data has recently become available to MDH, the collection process is voluntary with several facilities opting for nonparticipation. The data from the National Hospital Discharge Surveys used in this analysis estimates the number of U.S. discharges only. The primary difference between the two events is the time shift imparted by the length of hospital stay. One cannot be discharged from a hospital without being admitted, thus, they are roughly approximate counts of the number of hospitalizations.

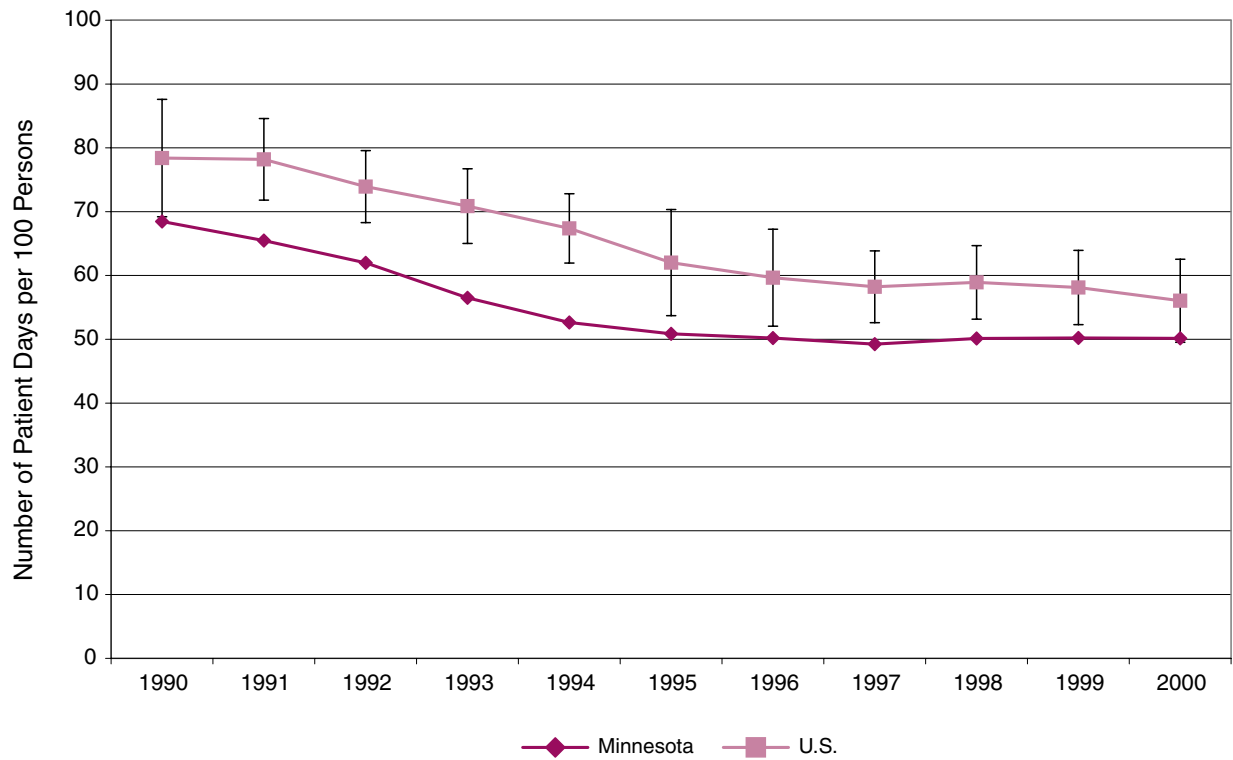
<sup>b</sup> This report uses a standard unit of analysis for rates based upon a population size of 100 persons in order to maintain a common metric for all ambulatory care modalities as well as acute care. Hospital use rates are typically expressed as some measure per 1,000 persons or 10,000 persons.

<sup>c</sup> Note that the U.S. point estimates in Figures 5 thru 7 are shown with confidence intervals (error bars) to account for sampling error. Comparisons between Minnesota and the U.S. take these intervals into account.



Figure 6

Minnesota and U.S. Hospital Patient Day Rate Trends, 1990 – 2000



Data Sources: MDH Health Care Cost Information System; National Hospital Discharge Surveys; U.S. Census July 1 population estimates.  
Note: U.S. Confidence interval at 95%.

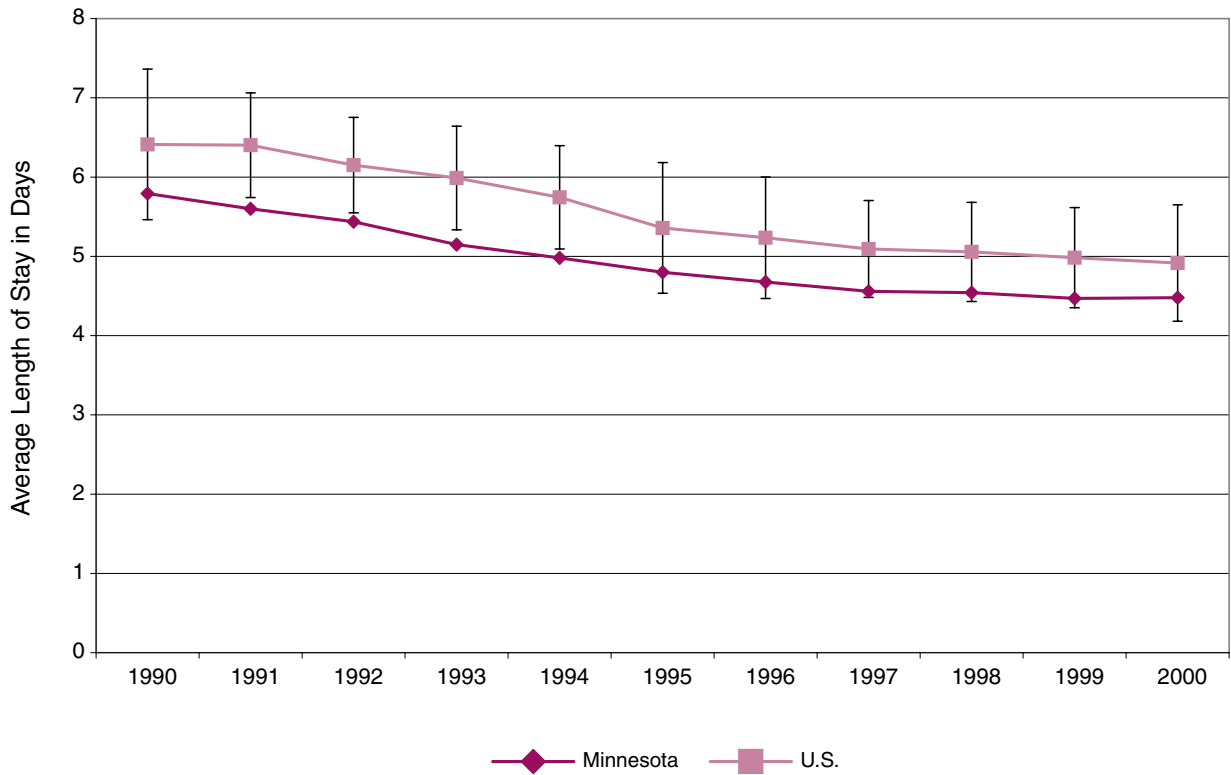
Figure 6 shows that Minnesota’s patient day utilization rate (number of patient days per 100 persons) was below the national rate for almost the entire decade, then the gap began to narrow in 2000. Both Minnesota and the U.S. patient day rates declined through 1995, but while the U.S. rate continued to drop, Minnesota’s rate was nearly flat from 1996 through 2000. The number of U.S. patient days per 100 persons from 1996 through 2000 was statistically significantly lower than the U.S. use rates of 1990 thru 1992.<sup>d</sup>

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<sup>d</sup> U.S. and Minnesota rates were unadjusted for case-mix, mix of payers, age and gender differences given that the Minnesota data needed were not available to make such adjustments.

Figure 7

Minnesota and U.S. Trends in Average Length of Hospital Stay, 1990 – 2000



Data Sources: MDH Health Care Cost Information System; National Hospital Discharge Surveys.  
 Note: U.S. Confidence interval at 95%.

The number of patient days per 100 persons is a product of the hospitalization rate per 100 persons and the average length of hospital stay. Figure 7 compares the U.S. average length of stay trend across the decade with that of Minnesota's. It's clear from this figure, that declining lengths of stay were a major factor in the waning of patient day use rates over time. Average lengths of stay fell more rapidly in the early half of the decade, then the drop slowed in the second half. Minnesota had shorter lengths of stay than the U.S. from 1991 thru 1994, but the gap narrowed toward the end of the decade. Average length of stay in the state was 5.8 days in 1990 dropping to 4.5 days in 2000, a decrease of 1.3 days or nearly 23%. The influence of managed care and innovations in medical technology likely precipitated this significant change.

Changes in patient day volumes closely correspond with changes in hospitals' occupancy rates. During the decade, Minnesota's hospital licensed bed occupancy rate declined from 44.5% in 1990 to approximately 41% of it capacity in 2000.<sup>e</sup> The difference between these two occupancy rates appears relatively small, but in 1990 there were 157 hospitals operating in the state with 18,973

<sup>e</sup> Licensed hospital bed capacity reflects only those beds licensed by the Minnesota Department of Health for all hospitals in the state. This number of "paper beds" does not reflect the number of beds actually set up, staffed and available for patient care.

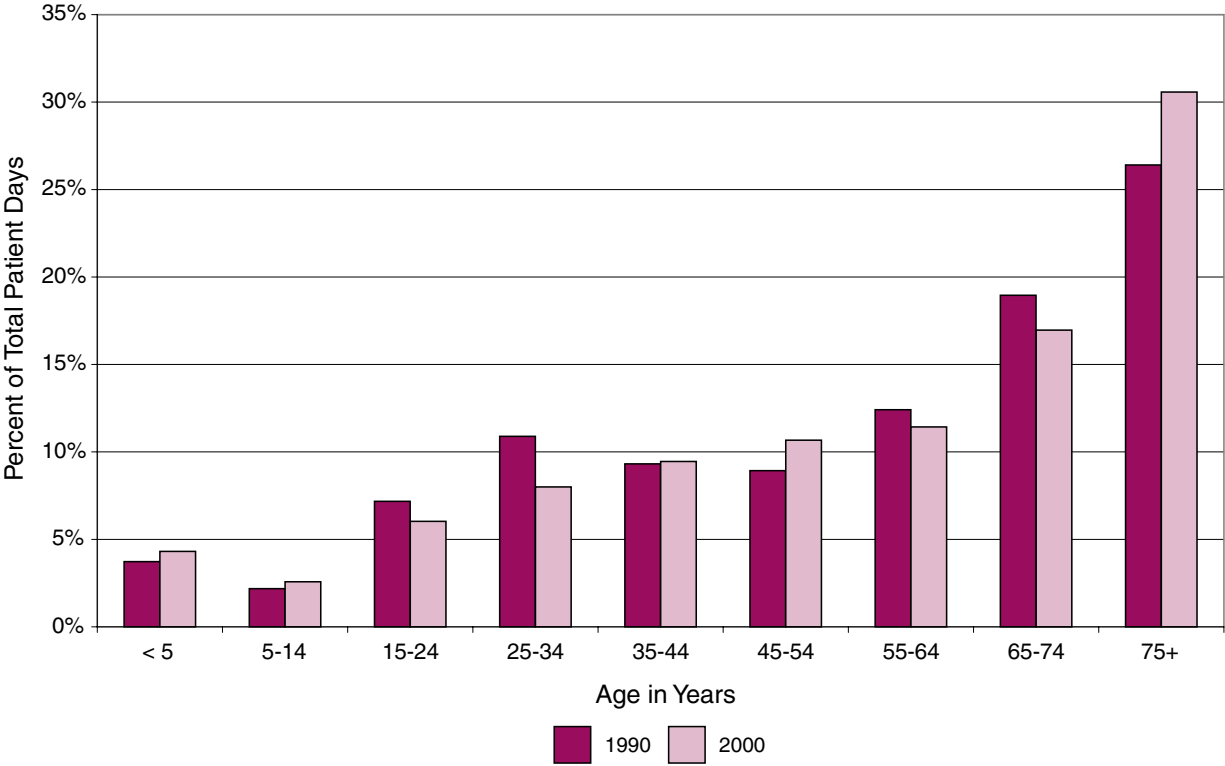
licensed bed compared with 139 hospitals and 16,533 beds in 2000, a nearly 13% decline in licensed capacity. Despite the reduction in bed capacity, occupancy rates had not rebounded to their 1990 level by 2000.

### Age-Related Changes in Hospital Use Rates

Absent representative Minnesota-specific hospital discharge data across the decade, this report relies upon the National Hospital Discharge Surveys conducted by the National Center for Health Statistics to provide a detailed view of the hospitalization patterns across the age spectrum. Because of the way in which these surveys were designed, the samples permit statistically testing whether the patterns have changed between 1990 and 2000. Figure 8 displays a typical age-related patient day distributional pattern.<sup>f</sup>

Figure 8

Cumulative Age Distribution of U.S. Hospital Patient Days, 1990 versus 2000



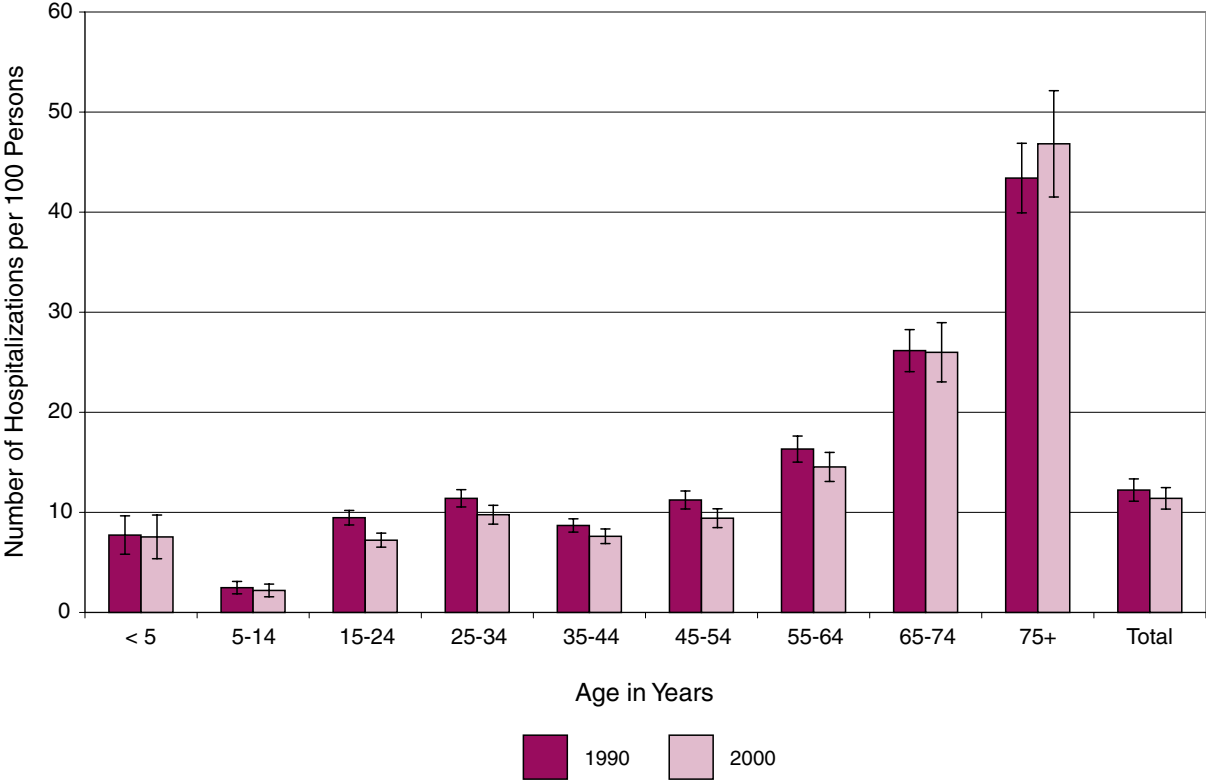
Data Sources: National Hospital Discharge Surveys, 1990 and 2000.

<sup>f</sup> Normal newborns are excluded from Figures to simplify the analysis.

Figure 8 reveals that the distribution of patient days, in general, increases with age. Following birth and the first five years of life, regardless of the survey year, the age distribution of patient days is low for children and young adolescents, then begins to rise as women enter their childbearing years, typically ages 15 thru 44, and as older adolescents and young adults experience adverse life events. Thereafter, the proportion of total patient days continues to rise slowly until at 65 and increases dramatically at age 75 and older. Persons 65 years of age and older accounted for 45% of all patient days in 1990 and nearly 50% of all days in 2000. While the overall proportion of U.S. patient days used by those over age 65 seniors rose over the decade, this increase was driven primarily by an increase in hospital days for those 75 and older, illustrating the observation by Pol and Thomas, noted earlier, that the hospitalization age breakpoint for senior citizens has continued to shift up over time to the 75 and older age group.

Figure 9

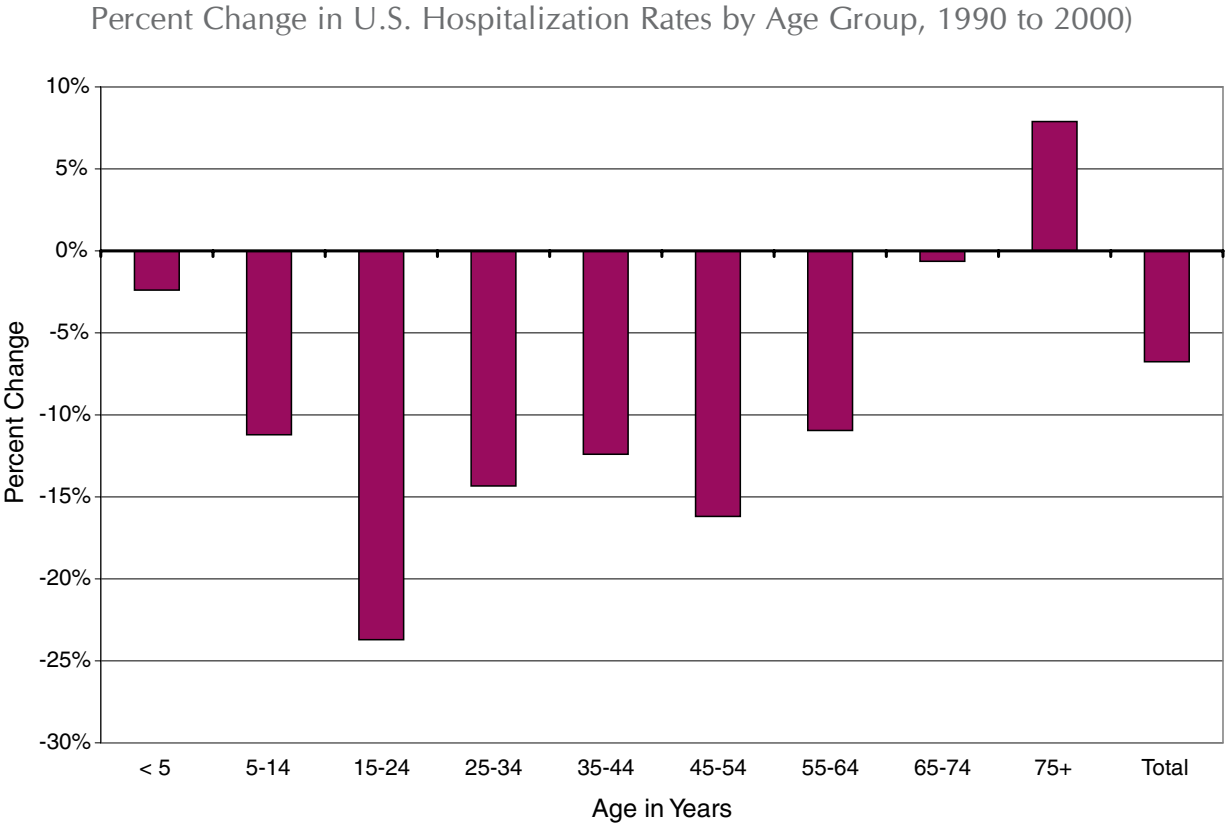
U.S. Hospitalization Rates by Age Group, 1990 versus 2000



Data Sources: National Hospital Discharge Surveys; U.S. Census July 1 population estimates.  
 Note: Hospitalizations measured as the number of discharges. Confidence interval level at 95%.

*Hospitalization Rates* - Figure 9 reveals the rate at which each age cohort was hospitalized,<sup>9</sup> while holding population size constant. It also compares the number of hospitalizations per 100 persons in each age group during 1990 to the same age group rate in 2000. As expected, hospitalization rates were lowest for children 5 to 14 years of age and highest for those 75 years and older. Those 65 to 74 years had the second highest rates, followed by the 55 to 64 year old age group. But the difference in rates between the oldest group (75+) and those in the 65 - 74 age group is quite striking. Those 75 and older are hospitalized at nearly twice the rate as those 65 - 74 years (47 hospitalizations per 100 persons versus 26 per 100 persons). Not quite as dramatic, but as important, is the difference in hospitalization rates between those 65 – 74 years and the near elderly (ages 55 to 64), at 15 hospitalizations per 100 persons versus 26 hospitalizations per 100 persons, respectively.

Figure 10



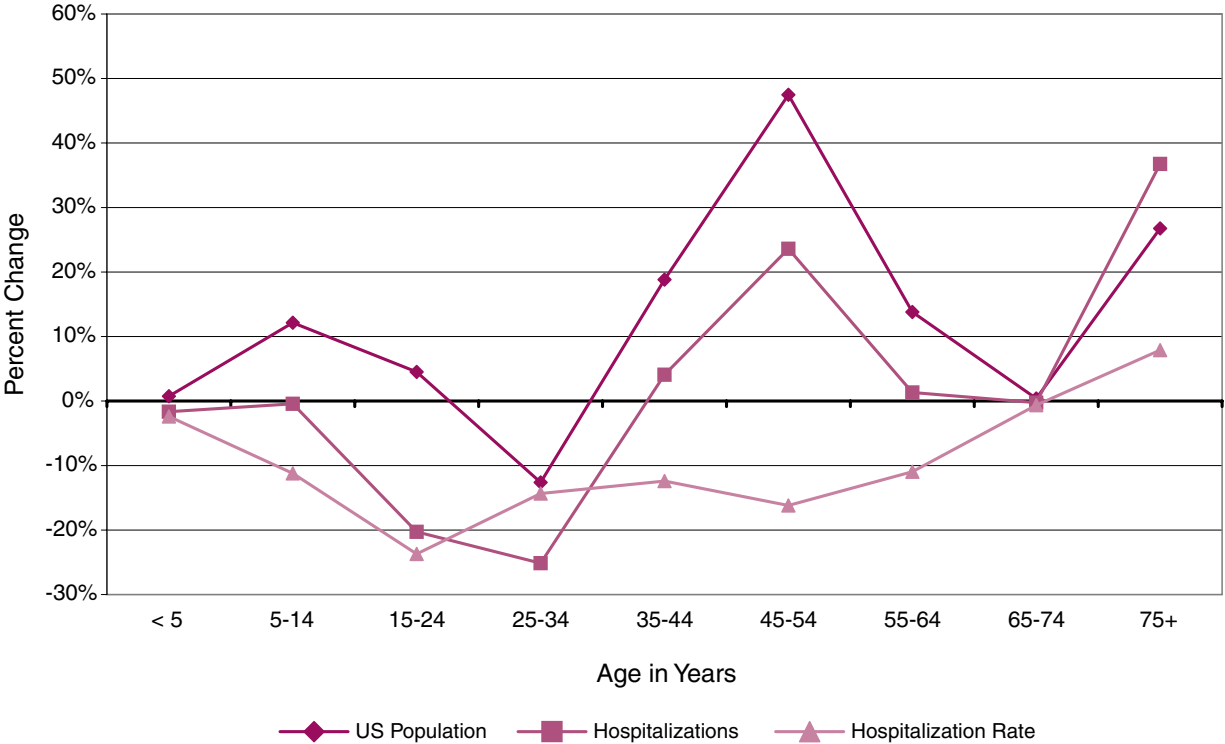
Data Sources: National Hospital Discharge Surveys; U.S. Census July 1 population estimates.  
 Note: Excludes newborns. Changes were only statistically significant for the 15 - 24 yr age group.

<sup>9</sup> The number of acute care discharges serves as the measure of hospitalizations in this section.

Across the decade, there was a statistically significant decline in the number of hospitalizations per 100 persons for only one age group, those 15 to 24 years of age. Changes for the balance of the age groups were not statistically significant, but the direction of the change was clear. The direction of the change in rates within age groups appears in Figure 10. People ages 15 to 24 years experienced the largest change in hospitalization rates (24% statistically significant decrease) between 1990 and 2000 followed by the oldest Baby Boomers, those 45 to 54 years (16% decline), then the 25 to 34 year olds rate, dropping 14%. The oldest senior citizens, 75 years plus, appeared to be hospitalized at higher rates in 2000 than in 1990, but the differences were not statistically significant.

Figure 11

Percent Change in U.S. Population Size, Number of Hospitalizations, and Hospitalization Rate by Age Group, 1990 to 2000



Data Sources: National Hospital Discharge Surveys; U.S. Census July 1 population estimates.  
 Note: Newborns excluded.

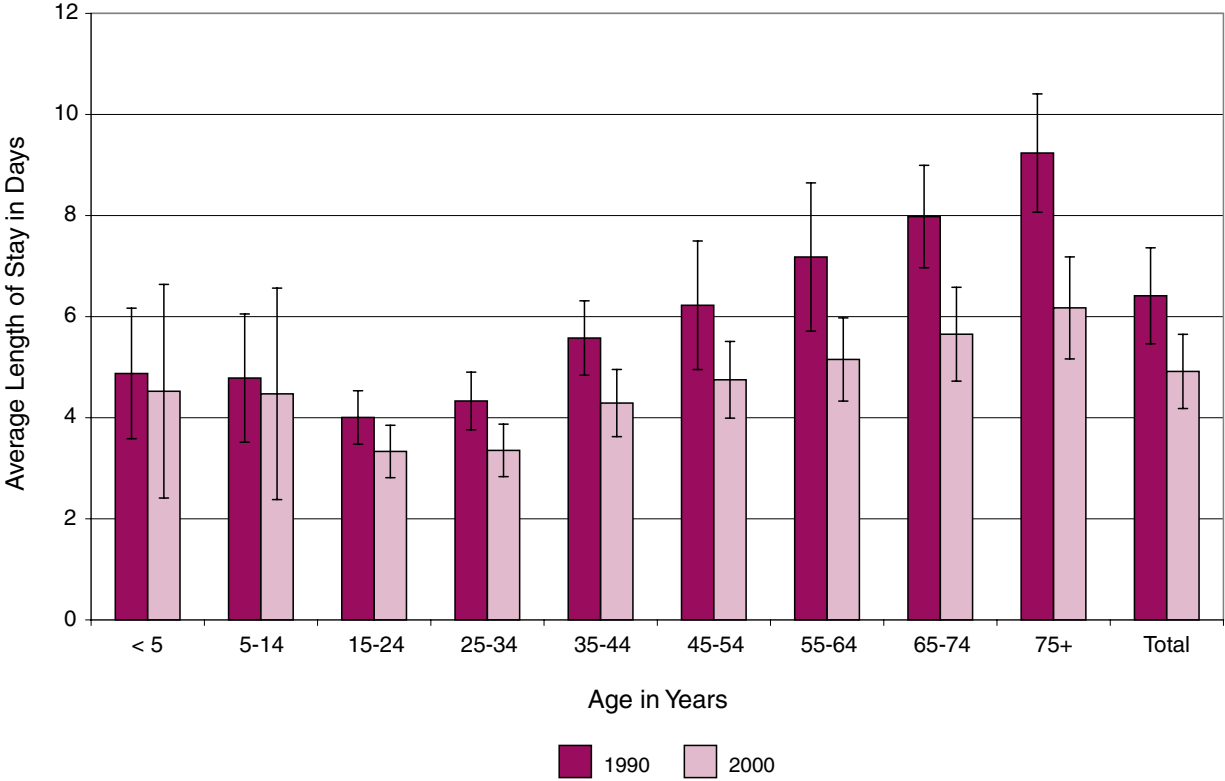
The information displayed in Figure 11 indicates that changes in the number of hospitalizations were driven largely by changes in population age group size rather than by changes in the hospitalization rate. Hospitalization rates were down across the board for those 5 to 64 years of age. The only age group experiencing an increase in hospitalization rate was those 75 years and old, although the difference was not statistically significant (refer to Figure 9). Changes in population age group size then, overwhelmed the decline in use rates, resulting in more hospital discharges for the Baby

Boom age groups between 1990 and 2000. Even for those age groups that showed declining hospitalizations over the decade, the changes in hospitalizations closely followed changes in population age group size. One implication of this finding suggests that as the Baby Boom cohort ends its childbearing years and begins to encounter the more complex clinical case-mixes that come with advancing age, the sheer size of the generation alone will likely be a primary driver of state and national health care costs, even if reductions in the rate of hospitalization continue into the future.

The length of a hospital stay often signals the complexity of patients' burden of illness and, when combined with information about number and type of services provided, the intensity of their care during a patients' stay. Perhaps the most significant change in hospital utilization that occurred over the decade was the dramatic decline in average length of patient stay, as shown in Figures 12 and 13.

Figure 12

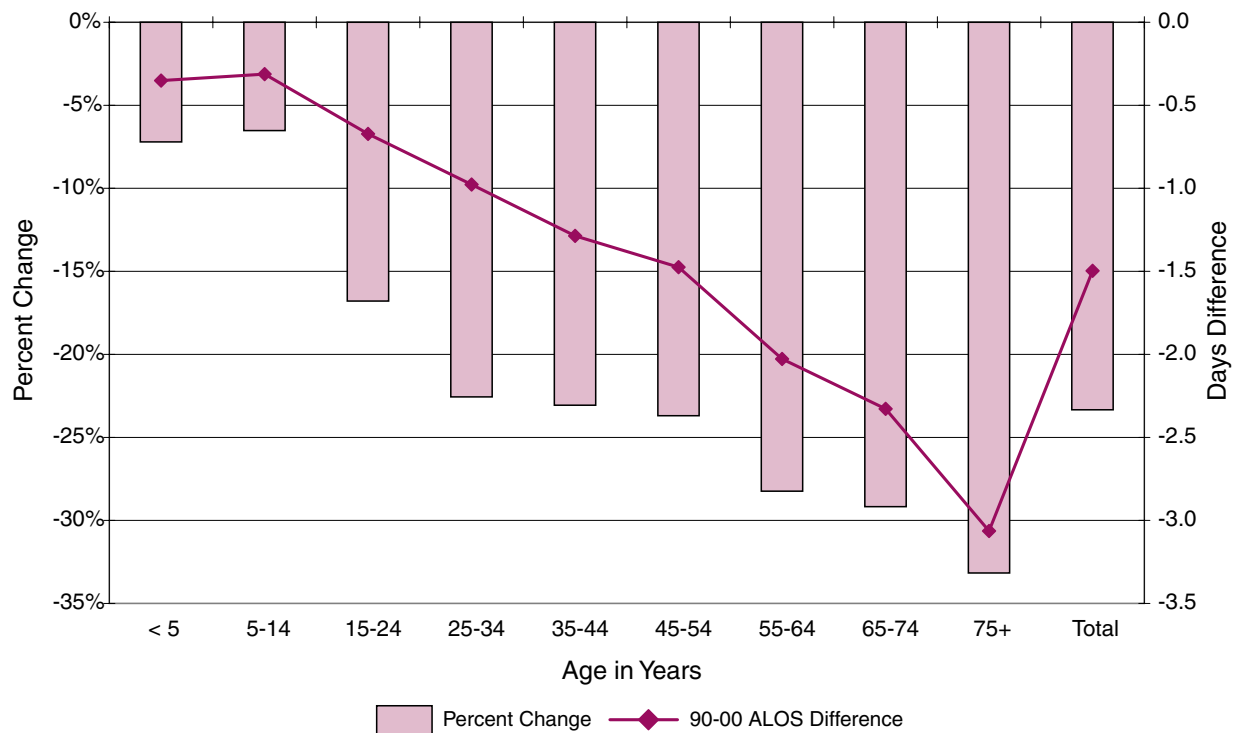
U.S. Hospital Average Length of Stay by Age Group, 1990 versus 2000



Sources: National Hospital Discharge Surveys.  
 Note: U.S. Confidence intervals at 95%.

Figure 13

Percent Change and Difference in U.S. Average Length of Stay, 1990 to 2000



Data Sources: National Hospital Discharge Surveys.  
 Note: Newborns excluded.

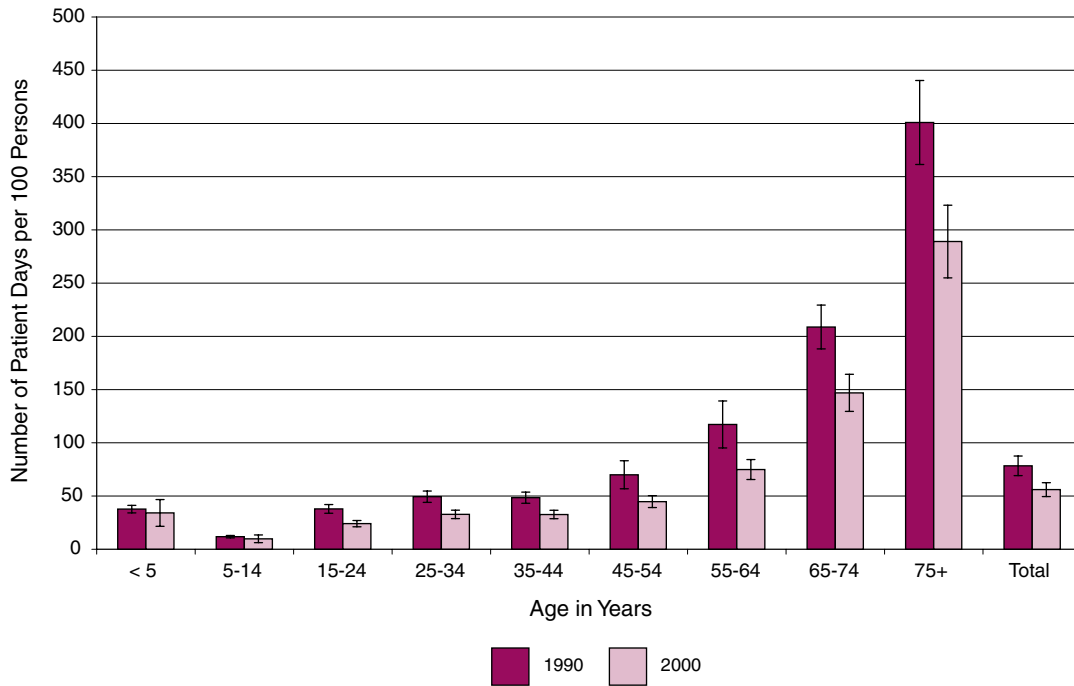
*Length of Stay* - Longer lengths of stay typically reflect more serious or clinically complex illnesses. Figure 12 shows that age-specific average lengths of stay were higher for children and early adolescents in 1990 and 2000, then dipped for young adults, but begin rising steadily again with the 35 to 44 year old age group. While it visually appears that average lengths of stay by age in 1990 were higher than in 2000, there were only two age groups where the differences were statistically significant, for those 65 – 74 years old and seniors 75 years up. Figure 13 summarizes the information in Figure 12 so that both the direction and magnitude of the change are clear.

Between 1990 and 2000, changes in medical technology, physician management of patient stays under managed care, and hospital-based changes in care delivery considerably shortened age-related lengths of stay. Figure 13 shows a decrease of one day or more in length of stay among every age group beyond age 14, with those 75 and over experiencing the largest reduction of slightly over 3 days, or a 33% decline. Reductions of two days or more were common among the age groups ranging from 25 to 74 years old.



Figure 14

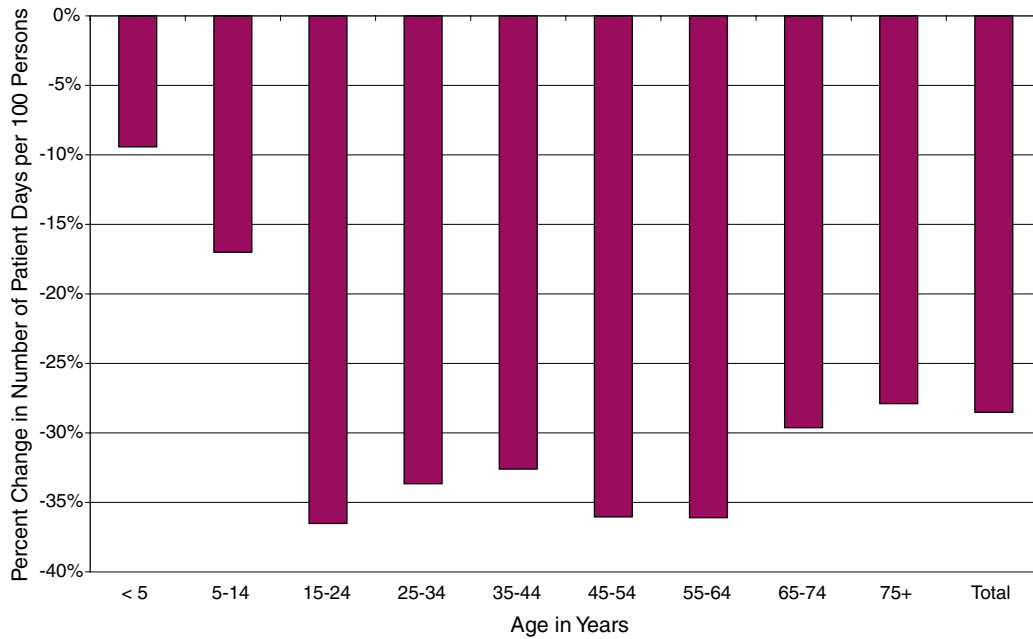
U.S. Hospital Patient Day Rates by Age Group, 1990 versus 2000



Data Sources: National Hospital Discharge Surveys; U.S. Census July 1 population estimates.  
 Note: Confidence intervals at 95%.

Figure 15

Percent Change in U.S. Patient Day Rates, 1990 to 2000



Data Sources: National Hospital Discharge Surveys; U.S. Census July 1 population estimates.  
 Note: Newborns excluded.

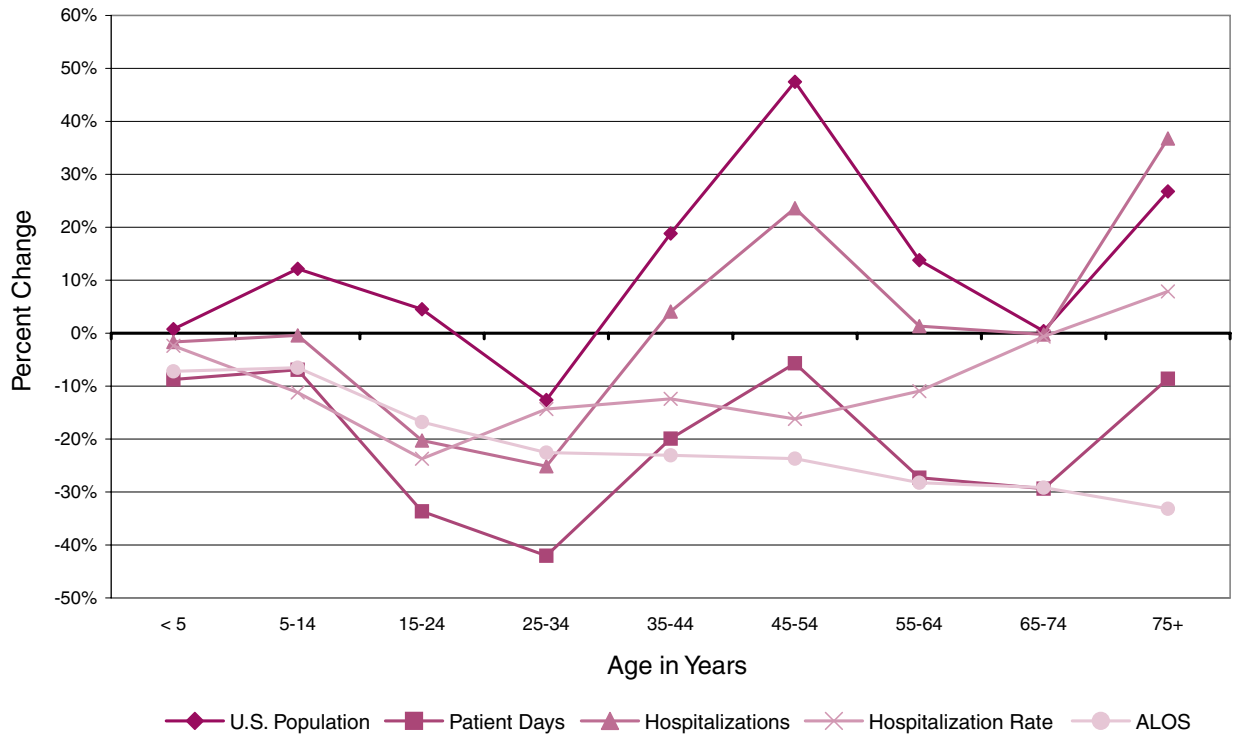
*Patient Days* - When hospitalization rates and average length of stay are considered together, their combination provides insight into the primary pace at which hospital care was being utilized by specific age groups of patients. Figure 14 shows the rates at which U.S. patients utilized patient days, independent of population size, during both 1990 and 2000. There was a statistically significant reduction in the number of patient days per 100 persons for every age group between 1990 and 2000, except for the two children's age groups under age 15. Figure 15 further illustrates the direction and magnitude of the change. It shows that the groups seeing the greatest use rate reductions, population size held constant, ranged in age from 15 to 64 years, covering the prime child-bearing and rearing years of the U.S. population. Close behind were the two senior citizen age groups, those persons 65 – 74 years and 75 years and older. The middle age groups were the focus of managed care cost and utilization control strategies over the decade, including many states where Medicaid coverage was contracted to managed care organizations.

Figure 15 suggests these strategies, in combination with advances in medical technology and patient care delivery, worked to reduce U.S. patient day utilization rates among these age groups by 33% or more over the period. Patients over age 65 also experienced statistically significant reductions in rates of patient day use. The Medicare program's risk contracting with managed care companies that reached peak national enrollment in 1998, a time when over 15% of the Medicare population was enrolled in contracting HMOs, likely influenced this reduction in use rates for the senior age groups.<sup>8</sup>

There are a number of ways hospital use can influence health care costs. Numbers of days spent in a facility and the intensity of care during the stay are likely two of the most significant drivers of hospital costs in relation to insurance premiums. Given that the data employed for this analysis do not include the means to measure care intensity, the number of patient days is the only measure of hospital output studied in this analysis. All other things being equal, a decrease in the number of days spent in the facility should result in cost reductions. Under managed care, however, service intensity often rises with reductions in length of stay, thus attenuating potential cost reductions. Such increases in care intensity, the introduction of new technology to improve and further shorten treatments, along with changes in facility pricing strategies, may offset to some degree, the cost savings realized with reductions in the number of patient days used.

Figure 16

Percent Change in U.S. Population Size, Number of Hospitalizations, Patient Days, and Average Length of Stay by Age Group, 1990 to 2000



Data Sources: National Hospital Discharge Surveys; U.S. Census July 1 population estimates.  
 Note: Newborns excluded.

Figure 16 shows that because of significant declines in overall average length of stay, no age group experienced a positive increase in the number of patient days between 1990 and 2000. Although the percent change in hospitalization rate for those 75 and over was positive and the age group size grew, the decline in length of stay offset these increases enough to result in a decline in the number of patient days. Reductions in length of stay and a dip in the hospitalization rate for the 45 to 54 years olds also kept the percent change in the number of patient days for the age group below zero despite the size of this segment of the Baby Boom cohort.

### Baby Boom Hospital Utilization

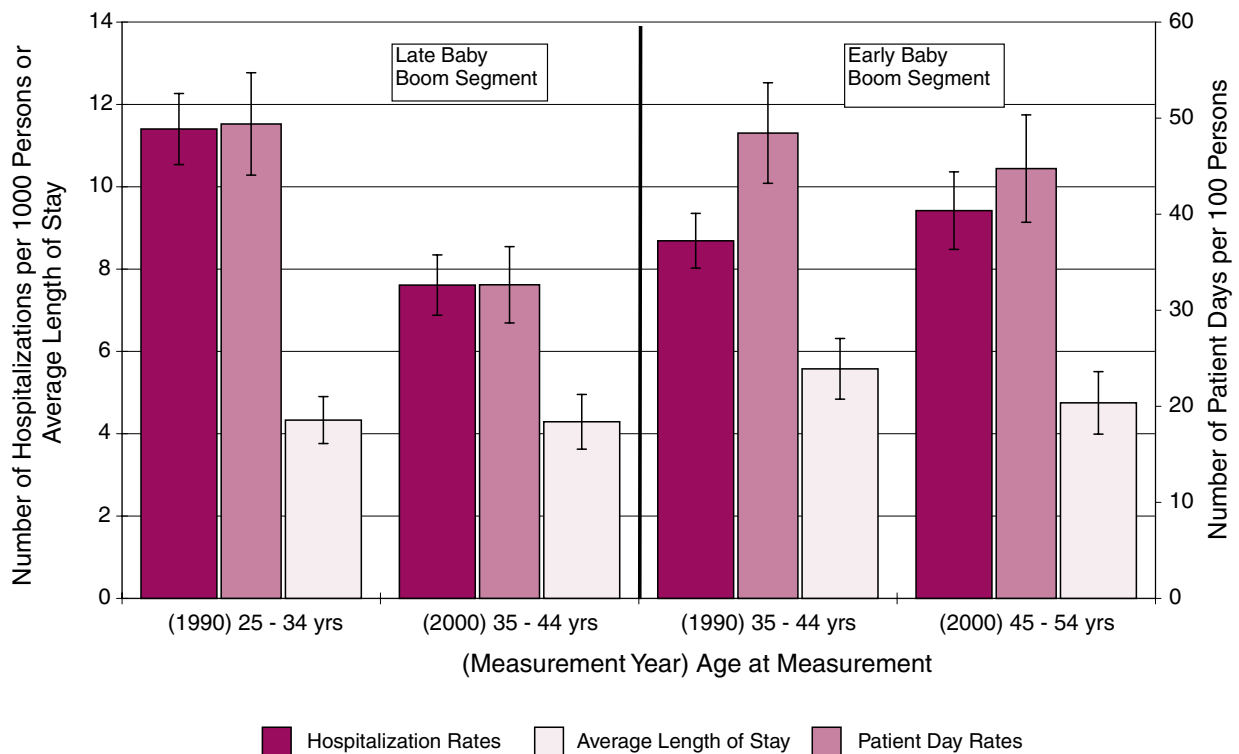
It has been shown that population size is a fundamental factor in the number of hospitalizations occurring over time. Given the size of the Post WWII Baby Boom generation, policymakers and stakeholders have expressed concern about the adequacy of existing hospital capacity and service mix of beds to handle the future health care needs of the cohort, as well as the rest of the population. There are several factors to consider when speculating about the future hospital utilizations patterns of Baby Boomers.

First, it's likely the Baby Boomers will not use health care resources in the same way their parents and grandparents did. As styles of medical practice and delivery have changed over time, the Baby Boom generation and its families have adapted to these changes. Managed care, as a primary delivery system, with its emphasis upon the substitution of ambulatory care for inpatient care and use of preventive services initiated the changes and will continue to have an impact on future care patterns.

Second, it is important to recognize that the Baby Boomer cohort is a nineteen to twenty-year wide aggregation of individuals born at different times from 1946 to 1964. The leading ten-year segment of the cohort contains a smaller proportion of the total Minnesota population, about 14% in 2000, than the last ten-year segment 17%. While both ten-year segments are large in size, the early segment is smaller than the later, which means the entire Baby Boom cohort won't impact the health care system all at the same time, or in the same way. Because of the age spread within the cohort, the early Boomer segment, being older, will likely present with a somewhat different constellation of conditions than the younger, later Boomer segment.

Figure 17

Hospital Utilization Rates Within Baby Boom Cohort Age Segments, 1990 to 2000



Data Sources: National Hospital Discharge Surveys; U.S. Census July 1 population estimates.  
 Note: Confidence intervals at 95%.

To illustrate this point, Figure 17 reorganizes information from earlier figures to more explicitly illustrate how the patterns of care have shifted for segments of the Baby Boom cohort over the decade studied. It shows that rates of hospitalization in 2000 for the leading edge of the generation, those now 45 to 54 years, were about the same as they were when this segment of the cohort was ten years younger. There was no statistically significant change in average length of stay, nor the number of patient days per 100 persons despite a likely change in the mix of conditions treated.<sup>h</sup> In other words, as the older boomers aged ten years, their aggregate utilization rate patterns did not significantly change.

Unlike their older cohort mates, the younger half of the generation did experience significant changes in their utilization indicators. Hospitalization rates declined 33% for those cohort members who were 25 to 34 years of age in 1990 and became 35 to 44 years of age in 2000. One of the leading factors responsible for this drop was that women in early part of the cohort were nearing the end of their childbearing years (typically 15 to 44 year of age)<sup>i</sup> in 2000. Fertility rates were higher when Boomer women were 25 to 34 years than when they were 35 to 44 years of age. There was no significant difference in average length of stay over the decade for this cohort segment. Primarily as a result of a decline in the hospitalization rate per 100 persons for the younger segment, the patient day rate declined after they aged ten years.

Table 1

Changes in Baby Boom Hospital Use Between 1990 and 2000

US BB Cohort Segs		Population Estimate	Inpatient Discharges	Patient Days	ALOS	Discharge Rate/100	Pat. Day Rate/100
(1990) 25 - 34 yrs	Late Boomers	43,536,999	4,964,600	21,506,101	4.3	11.4	49.4
(2000) 35 - 44 yrs	Late Boomers	45,115,131	3,433,360	14,730,666	4.3	7.6	32.7
(1990) 35 - 44 yrs	Early Boomers	37,969,482	3,298,668	18,395,515	5.6	8.7	48.4
(2000) 45 - 54 yrs	Early Boomers	37,161,671	3,500,484	16,628,540	4.8	9.4	44.7
<b>Total US BB Cohort</b>							
1990 (25 - 44 yrs)	Segs Combined	81,506,481	8,263,268	39,901,616	4.8	10.1	49.0
2000 (35 - 54 yrs)	Segs Combined	82,276,802	6,933,844	31,359,206	4.5	8.4	38.1

Data Sources: National Hospital Discharge Surveys; U.S. Census July 1 population estimates

<sup>h</sup> The top five conditions for hospitalization among 25-34 year olds in 2000 were: 1) Vaginal Delivery with complicating diagnoses; 2) Cesarean Section with complications or comorbidities; 3) Psychoses; 4) Vaginal deliveries with complicating diagnoses; 5) Vaginal delivery with Sterilization or D&C. (Top five conditions account for 52% of cases).

The top five conditions for hospitalization among of 35-44 year olds in 2000 were: 1) Psychoses; 2) Vaginal Delivery with complicating diagnoses; 3) Uterine and Adnexa procedures for non-malignant conditions without complications or comorbidities; 4) Cesarean Section with complications or comorbidities; and 5) Alcohol/drug abuse or dependence. (Top five conditions account for 28% of cases).

The top five conditions for hospitalization among 45-54 year olds in 2000 were: 1) Psychoses; 2) Uterine and Adnexa procedures for non-malignant conditions without complications or comorbidities; 3) Pacemaker implants with AMI, heart failure or shock; 4) Chronic Obstructive Pulmonary Disease; and 5) Heart Failure and Shock. (Top five conditions account for 16% of cases).

<sup>i</sup> See previous footnote.

Table 1 shows that the Baby Boomers, on a national level, used 8.5 million fewer patient days in 2000 than in 1990, primarily as the result of 1.3 million fewer hospitalizations. Average length of stay was only slightly lower over the period, 4.8 days in 1990 versus 4.5 days in 2000. These national data strongly suggest that there was no increase in hospital utilization by the Baby Boomer generation over the decade despite their aging ten years. Given the similarity of U.S. utilization patterns to Minnesota's, it is unlikely that the aging of the Baby Boom was the underlying cause of the increased number of Minnesota admissions since 1995. The sheer size of the generational cohort, however, will likely begin to encounter the health system in a more significant manner by 2010, when the smaller, older segment of the cohort hits age 65, to be followed by the larger second segment in approximately 2020. If hospitalization rates remain similar to those exhibited in Figure 9, the major impact upon current infrastructure will occur when both Boomers segments reach age 75. That will happen in 2020 for the oldest segment and 2040 for the youngest segment. The key unknowns for understanding the future demand for hospital services of this cohort are its likely longevity, the number of Boomer seniors living well into their 80s, 90s and beyond, and the types of unexpected health threats they will likely encounter as they age.

## Section Conclusions

Given the close correspondence between changes in the most significant hospital utilization measures within both the U.S. and Minnesota, an almost across-the-board decline in the patient days used per 100 persons was observed, precipitated by a steep reduction in average length of stay over the decade, and further amplified by a decline in hospitalization rates for specific age groups. These declines were likely due to the strong influence of managed care utilization controls, financial incentives for physicians, and advances in medical technology plus pharmaceuticals that made the substitution of ambulatory care for inpatient care possible as well as shorter hospital stays.

The rise in Minnesota hospitalizations, as shown in Figure 1, appears to result primarily from an increase in overall state population size, plus growth among specific age groups over the decade. State population growth due to in-migration from other states and countries was largest in the adolescent to middle childbearing years, which likely added to increased hospitalizations while not increasing length of stay. There was also an increase in the number of senior citizens 75 years of age and up in the state, but the data are unclear as to whether there was any change in the rate at which they were hospitalized.

Baby Boomers accounted for nearly 28% of all U.S. hospitalizations in 1990, but 22% in 2000. They used fewer patient days nationally in 2000 than in 1990, primarily as the result of 1.3 million fewer hospitalizations, while average length of stay was just slightly lower over the period. The data strongly suggests that there was no increase in hospital utilization by the Baby Boom generation over the decade. Now moving past their childbearing years, the Boomer cohort, therefore, was not likely behind the increase in number of hospitalizations recently experienced in Minnesota between 1990 and 2000.

At the time of this analysis, Minnesota reliably collects only an annual census of all hospital admissions. While a sample of hospital discharge data has recently become available to MDH, the collection process is voluntary with several facilities opting for nonparticipation. The data from the National Hospital Discharge Surveys used in this analysis estimates the number of U.S. discharges only. The primary difference between the two events is the time shift imparted by the length of hospital stay. One cannot be discharged from a hospital without being admitted, thus, they are roughly approximate counts of the number of hospitalizations.

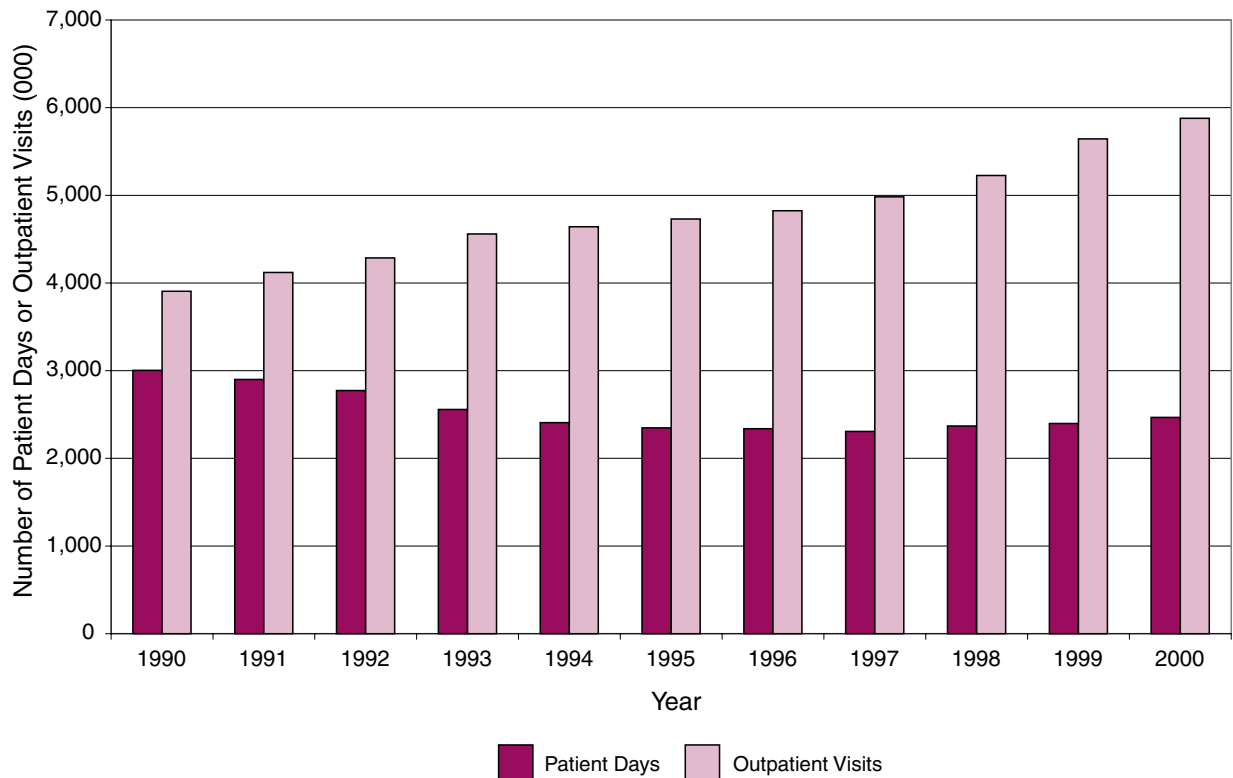




## 4 Hospital Outpatient Services

Figure 18

Minnesota Trends in Hospital Patient Days and Outpatient Visits, 1990 – 2000



Data Source: MDH Health Care Cost Information System

Note: MN OP visits include, ambulatory surgery, ED, ancillary services; excludes hospice and home health visits.

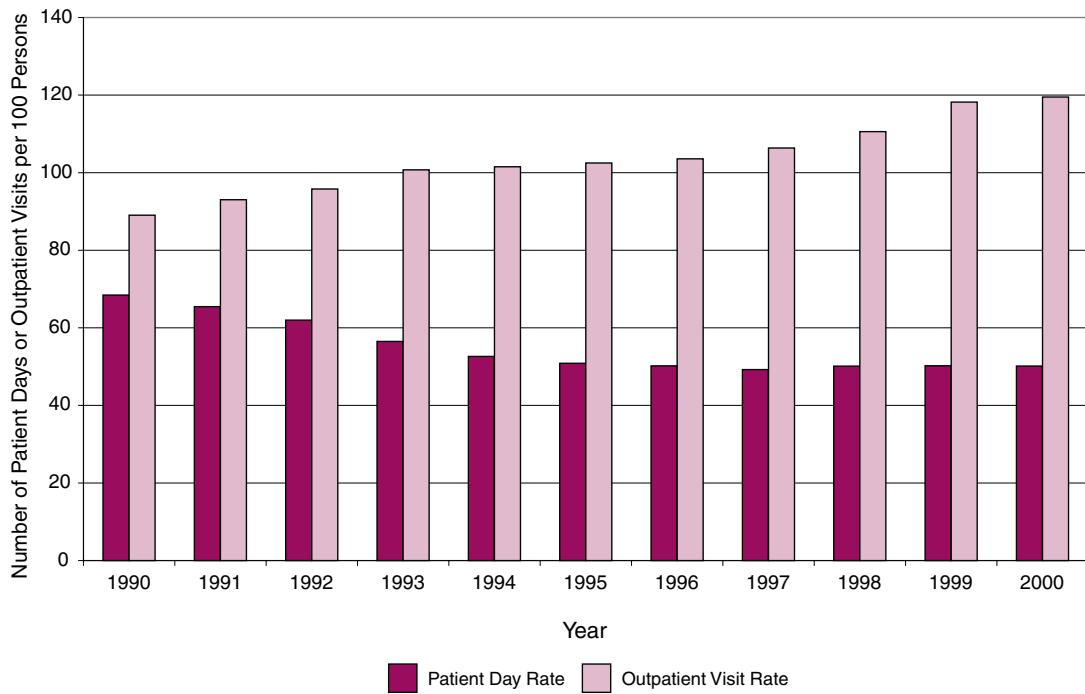
### Minnesota Hospital Outpatient Visit Trends

Minnesota was an earlier adopter of managed health care practices and as a result, the trend toward substituting hospital outpatient and office-based ambulatory care for inpatient care occurred in the state before a similar national trend materialized. Figure 18 exhibits the nominal trends for all outpatient registrations and patient days at Minnesota's hospitals from 1990 thru 2000. The number of patient days provided declined from a little over 3 million days in 1990 to just under 2.5 million days in 2000, a nearly 18% drop. Over the same period, Minnesota hospital outpatient visits<sup>1</sup> rose from 3.9 million in 1990 to nearly 5.9 million in 2000, a 51% increase.

<sup>1</sup> Minnesota hospital outpatient registrations include: Emergency Department visits; outpatient care visits with and without physician contact, some for ancillary services only. Hospice and home health visits are excluded. The number of registrations versus the number of actual visits may not necessarily agree.

Figure 19

Trends in Minnesota Hospital Patient Day and Outpatient Visit Rates, 1992-2000



Data Source: MDH Health Care Cost Information System; U.S. Census July 1 population estimates.  
 Note: MN OP visits include, ambulatory surgery, ED, ancillary services; excludes hospice and home health visits.

Figure 20

Trends in U.S. Hospital Patient Day Rates and Outpatient Visits Rates 1992 – 2000



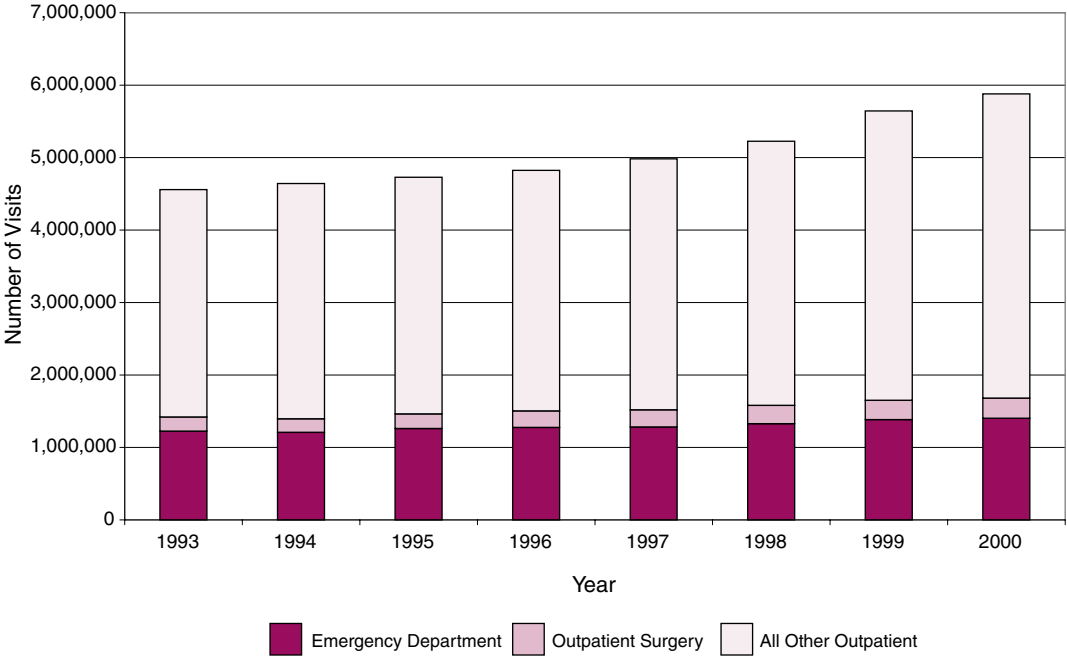
Data Sources: National Hospital Discharge Surveys; National Hospital Ambulatory Care Surveys; U.S. Census July 1 population estimates.  
 Note: Includes both Outpatient and Emergency Department visits combined.

Figure 19 provides another view of the decade long utilization trend for the two service measures, but this time holds state population size constant. The Minnesota use rate for hospital outpatient visits climbed from 89 visits per 100 persons in 1990 to 120 per 100 in 2000, a 34% increase. In contrast, the patient day use rate dropped from of 69 days per 100 persons in 1990 to 50 days per 100 by 2000, a 27% decline. Similar national level rates are displayed in Figure 20.<sup>k</sup> As shown, the U.S. ambulatory visit rate did not begin to exceed the U.S. patient day rate until 1997.<sup>l</sup> This suggests that the practice of substituting hospital ambulatory care for inpatient care was slower to catch on across the nation than in Minnesota. Figure 19 implies that the shift in modalities was already under way in the state before 1990.

*Hospital Outpatient Departments* – Hospital outpatient departments vary from place to place with regard to the breadth and scope of ambulatory services they offer. This is especially true in Minnesota where hospital outpatient department capabilities are quite diverse and vary by geographic location. For example, the full spectrum of emergency, trauma, and outpatient/ambulatory care is available at central city medical centers, such as Hennepin County Medical Center, Regions Hospital, St. Cloud Hospital, or St. Mary’s Medical Center in Duluth. In contrast, basic emergency services and primary care capabilities are the norm at the 48 Critical Access Hospitals across greater Minnesota.

Figure 21

Trend in Minnesota Hospital Outpatient and Emergency Department Visits, 1993 to 2000



Data Source: MDH Health Care Cost Information System  
 Note: Reliable hospital outpatient registration counts began in 1993.

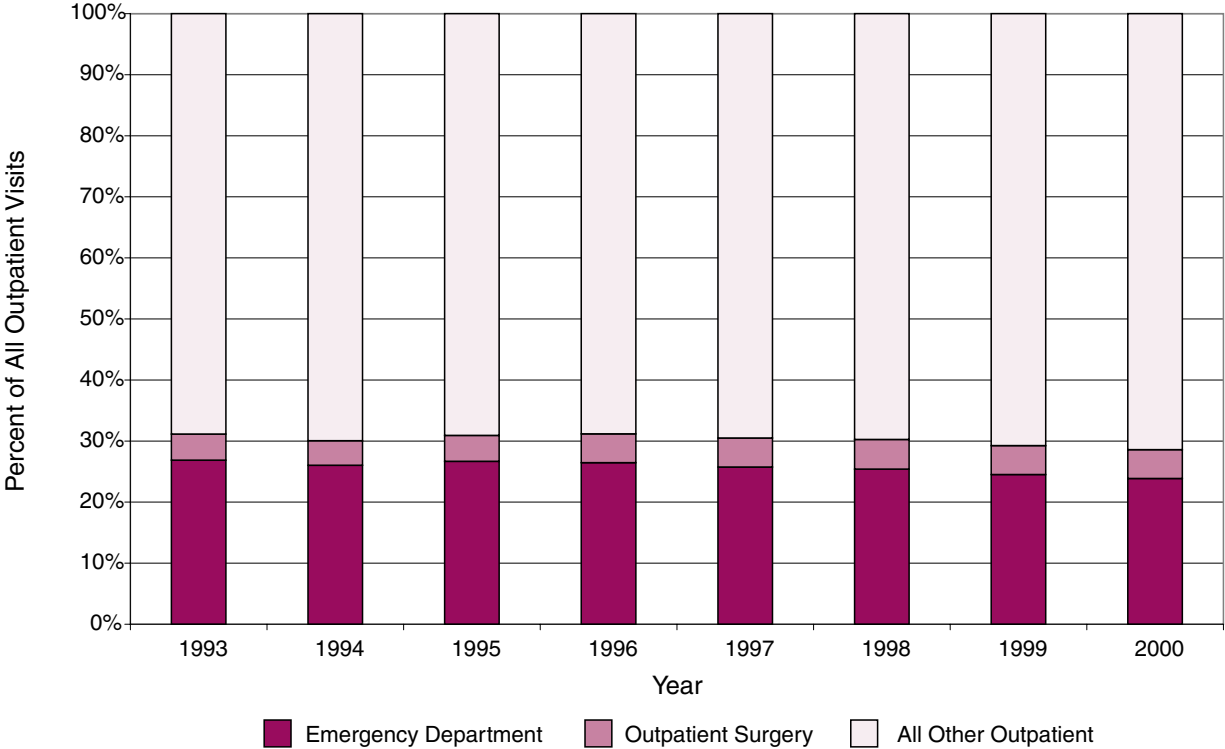
<sup>k</sup> U.S. rates were not precisely comparable with Minnesota's rates in that outpatient visits without seeing a physician during the encounter were considered out of scope in the national survey.

<sup>l</sup> The National Hospital Ambulatory Care Survey was first conducted in 1992.

This diversity is not fully captured by the census of total outpatient volume reported to MDH’s Health Care Cost Information System by Minnesota hospitals. As shown in Figure 21, hospital outpatient volumes are a combination of three broad reporting categories of ambulatory services: emergency department registrations, registrations for outpatient surgery, and all other outpatient visits. Between 1993 and 2000, aggregate hospital ambulatory volume increased of by 29%. Among the three constituent categories, outpatient surgery saw the largest volume increase at 42.3%, followed by all other outpatient services with 33.7%, while emergency department visits increased 14.6% over the period.

Figure 22

Distribution of Minnesota Hospital Outpatient Services, 1993 to 2000



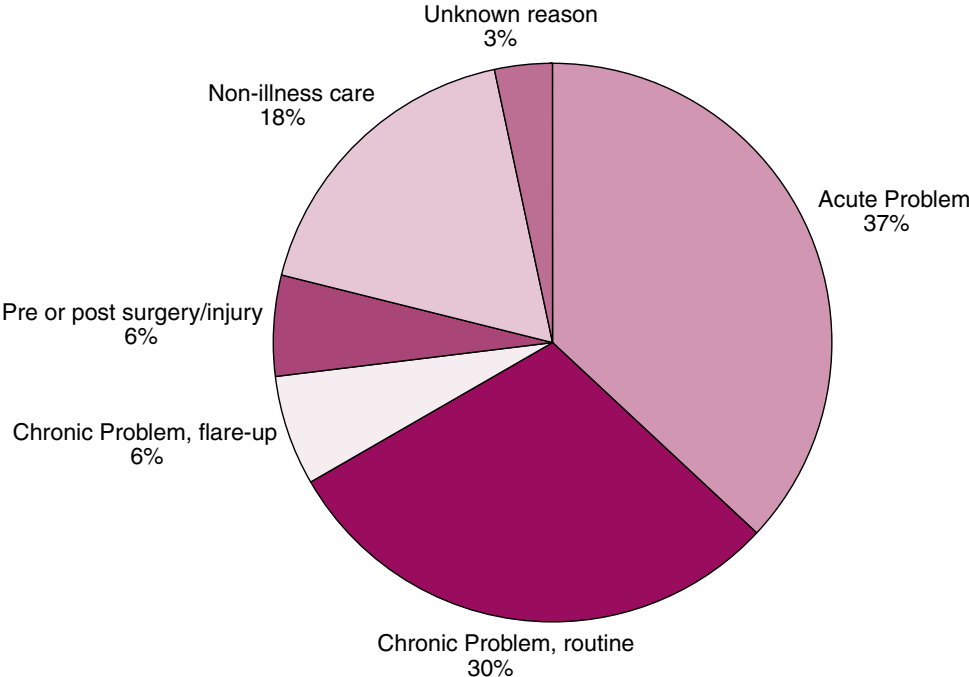
Data Sources: MDH Health Care Cost Information System  
 Note: Reliable outpatient registration counts began in 1993.

The mix of outpatient services, expressed as a percentage of total visits in Figure 22, was very stable between 1993 and 2000 with other outpatient services accounting for 68.9% of the total in 1993; emergency department visits 26.9%, and outpatient/ambulatory surgery at 4.3%. In 2000, these proportions changed to 71.4%, 23.9%, and 4.7% of total visits respectively, with other outpatient services becoming a slightly larger proportion of the service mix.

U.S. ambulatory care volume estimates for 2000 show that 3.9% of all U.S. hospital outpatients' visits incorporated outpatient surgery, while 4.1% of all U.S. physician office visits included ambulatory surgery.<sup>m</sup> These percentages are very similar to, but slightly below those reported by Minnesota hospitals for outpatient surgery (4.7%). Lacking detailed Minnesota-specific hospital ambulatory data for describing the types of health conditions seen at specific facilities, this analysis employs information from the National Hospital Ambulatory Medical Care Surveys (NHAMCS) as a proxy to gain insight into the factors likely to underlie hospital outpatient trends in Minnesota.<sup>n</sup>

Figure 23

Major Reasons for U.S. Hospital Outpatient Visits in 2000



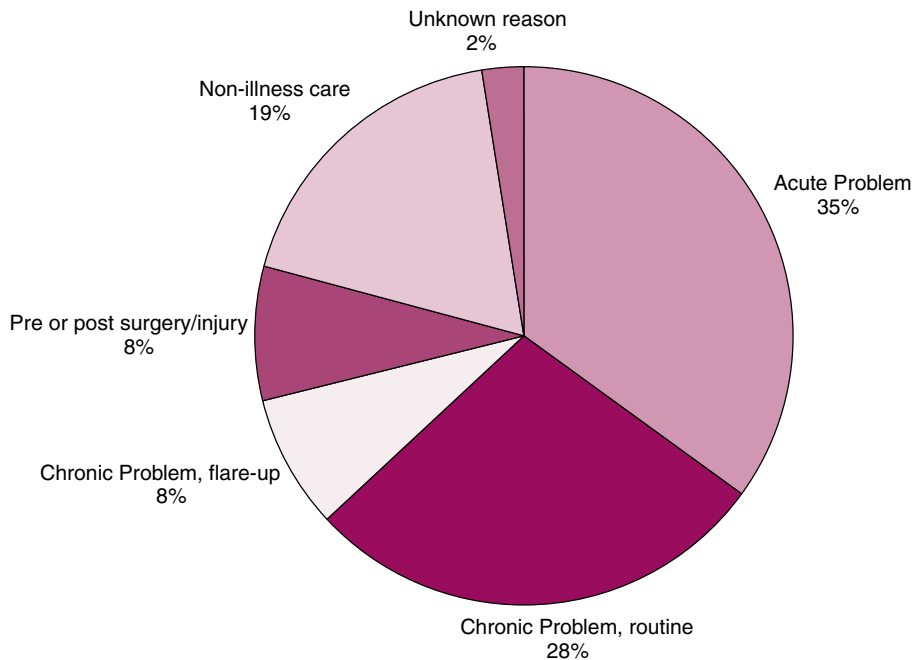
Data Source: National Hospital Ambulatory Medical Care Survey, Outpatient Department only.  
 Note: Excludes care provided in the Emergency Department.

<sup>m</sup> Similar data were collected in both the National Hospital Ambulatory Medical Care Survey and National Ambulatory Medical Care Survey in 2000. Results reported are raw proportions unadjusted for age, sex, and patient disease burden. Further analysis is required to test whether hospital patients were sicker or whether the hospital ambulatory surgeries were more complex.

<sup>n</sup> Within the NHAMCS measurement framework, a hospital ambulatory visit is defined as a direct, personal exchange between a patient and a physician, or a staff member acting under a physician's direction, for the purpose of seeking care and rendering health services. MDH collects a count of all hospital outpatient registrations regardless of the purpose for the visit.

Figure 24

### Major Reasons for Physician Office Visits in 2000



Data Source: National Ambulatory Medical Care Survey.

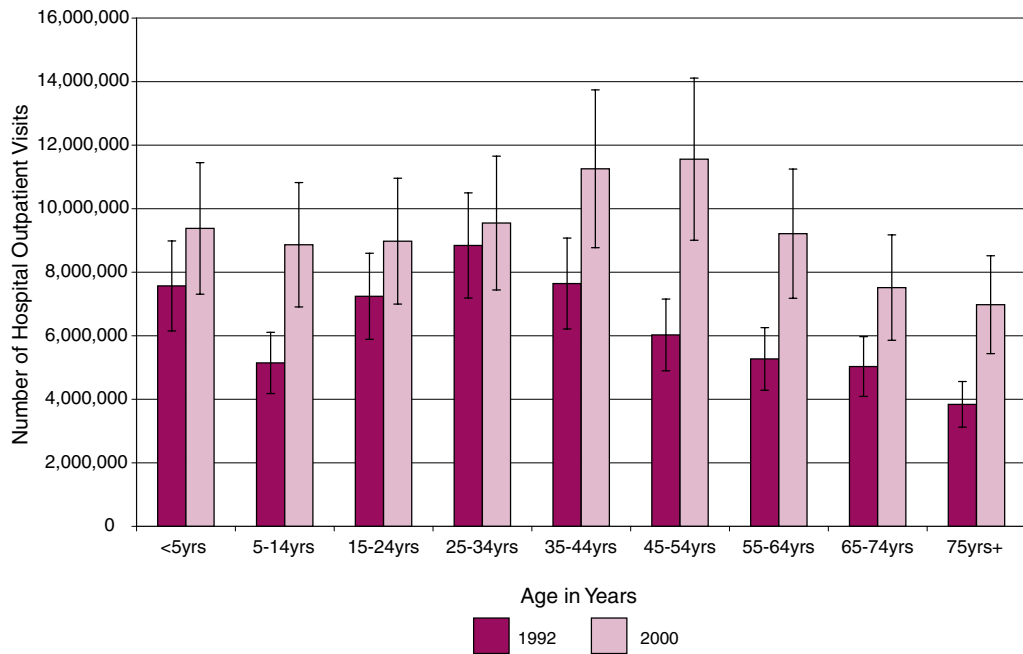
*National Survey Results* - During 2000, Figure 23 exhibits that the major reasons for visits to U.S. hospital outpatient departments, regardless of size or location, were for care related to: 1) acute health problems; 2) routine care for chronic problems; and, 3) non-illness care, in that order. The first two categories accounted for 67% of all outpatient visits. Thirty-seven percent of visits were for acute health problems related to a condition, illness, or injury having a relatively sudden or recent onset within three months of the visit, while 30% were for the routine care of chronic problems in which the onset of the condition was three months or more before the visit. The third category, constituting 18% of all hospital outpatient visits, consisted of general health maintenance exams and routine periodic examinations of presumably health persons, both children and adults, including prenatal and postnatal care, annual physicals, well-child visits and insurance examinations.<sup>9</sup> Figure 24 shows that the reasons given for visits to U.S. physician office visits in 2000 were very similar, further highlighting the general potential for hospitals and physicians to compete to provide comparable ambulatory services that are similar.<sup>o</sup>

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<sup>o</sup> Figures 23 and 24 are based upon raw counts unadjusted for patient age, gender, and disease burden.

Figure 25

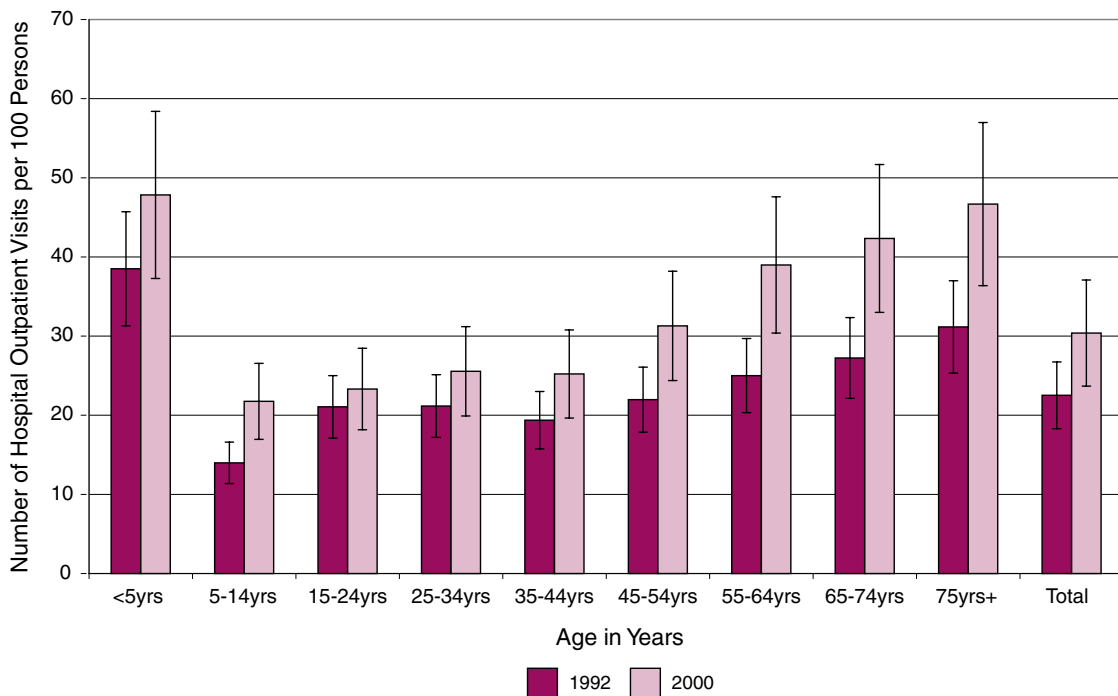
Number of U.S. Hospital Outpatient Visits by Age Group, 1992 versus 2000



Data Sources: National Hospital Ambulatory Medical Care Surveys.  
 Note: Confidence intervals at 95%.

Figure 26

U.S. Hospital Outpatient Visit Rates by Age Group, 1992 versus 2000

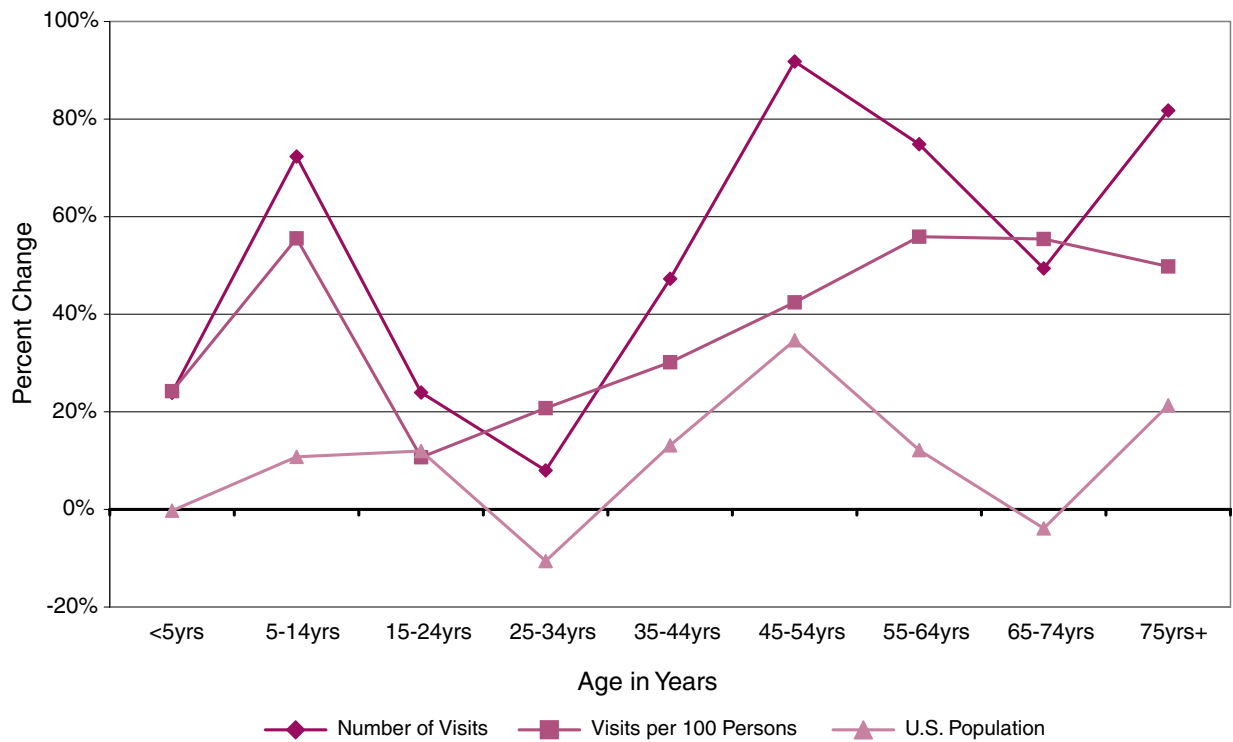


Data Sources: National Hospital Ambulatory Medical Care Surveys; U.S. Census July 1 population estimates.  
 Note: Confidence intervals at 95%.

There was a 47% increase in the estimated number of non-emergency hospital outpatient visits across the U.S. from 1992 to 2000, rising from 56.6 million to 83.3 million over the period.<sup>p</sup> Figure 25 indicates that while visit volumes appeared to increase across all age groups, the statistically significant increases occurred for those ages 5 to 14 years, 45 to 54 years (early Baby Boomers), 55 to 64 years, and 75 years and up. Figure 26 reveals that, holding age-specific population size constant, the three age groups experiencing statistically significant increases in the number of hospital outpatient visits per 100 persons were those 5 to 14 years (a 56% increase), 55 to 64 years (a 56% increase), and persons 65 to 74 years (a 55% increase). While not statistically significant, there was a 50% increase in the rate of use for persons over 75 years of age as well.

Figure 27

Percent Change in the Number of U.S. Hospital Outpatient Visits, Visit Rates, and Population Size, 1992 to 2000



Data Sources: National Hospital Ambulatory Medical Care Surveys; U.S. Census July 1 population estimates.

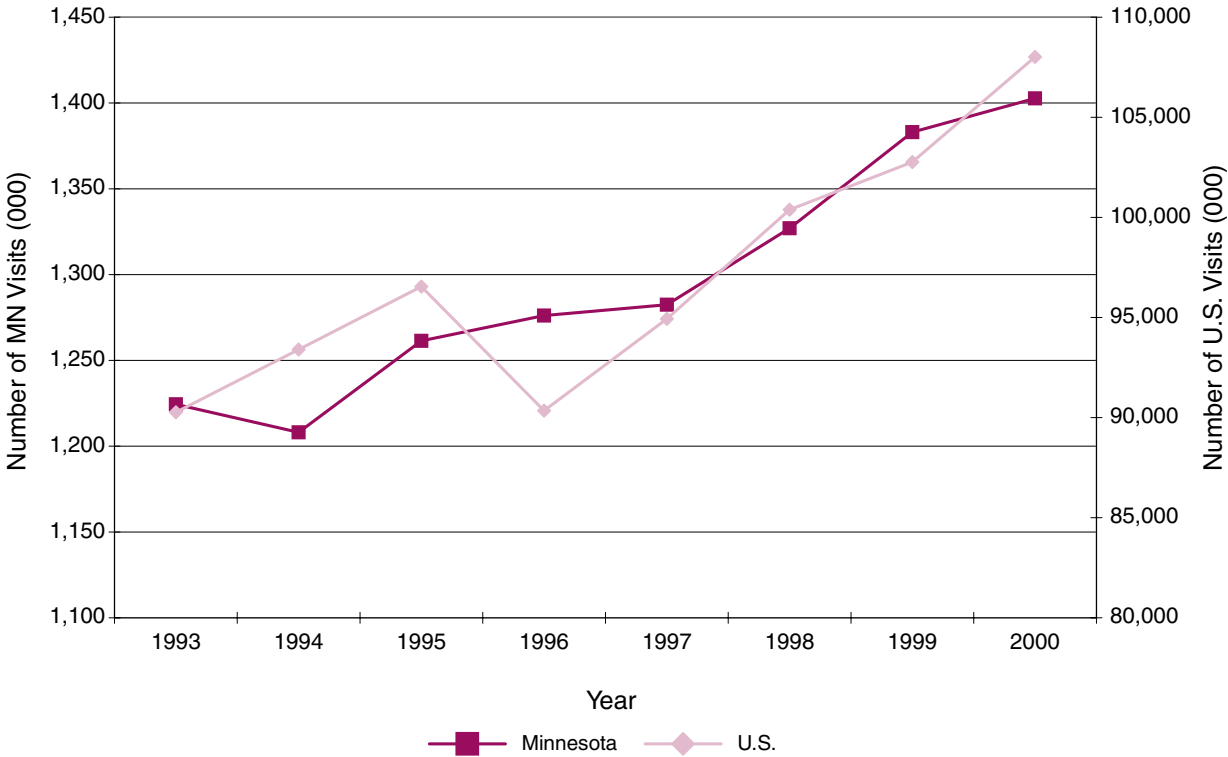
<sup>p</sup> Matching the period over which Minnesota data were available, from 1993 to 2000, the number of non-emergency outpatient visits rose 25% in the U.S. compared with 34% in Minnesota.



Much like inpatient hospital use, Figure 27 shows that changes in population size are the predominant driving force in the volume of hospital outpatient visits. However, the effect of population growth and age shift is amplified by significant changes in the rate of use within specific age groups, with rates increasing for some groups more than others. Both population growth and the major shift from inpatient to outpatient services were behind the 47% increase in outpatient service use over the nine-year period studied.

Figure 28

Minnesota and U.S. Trends in Emergency Department Visits, 1993 - 2000



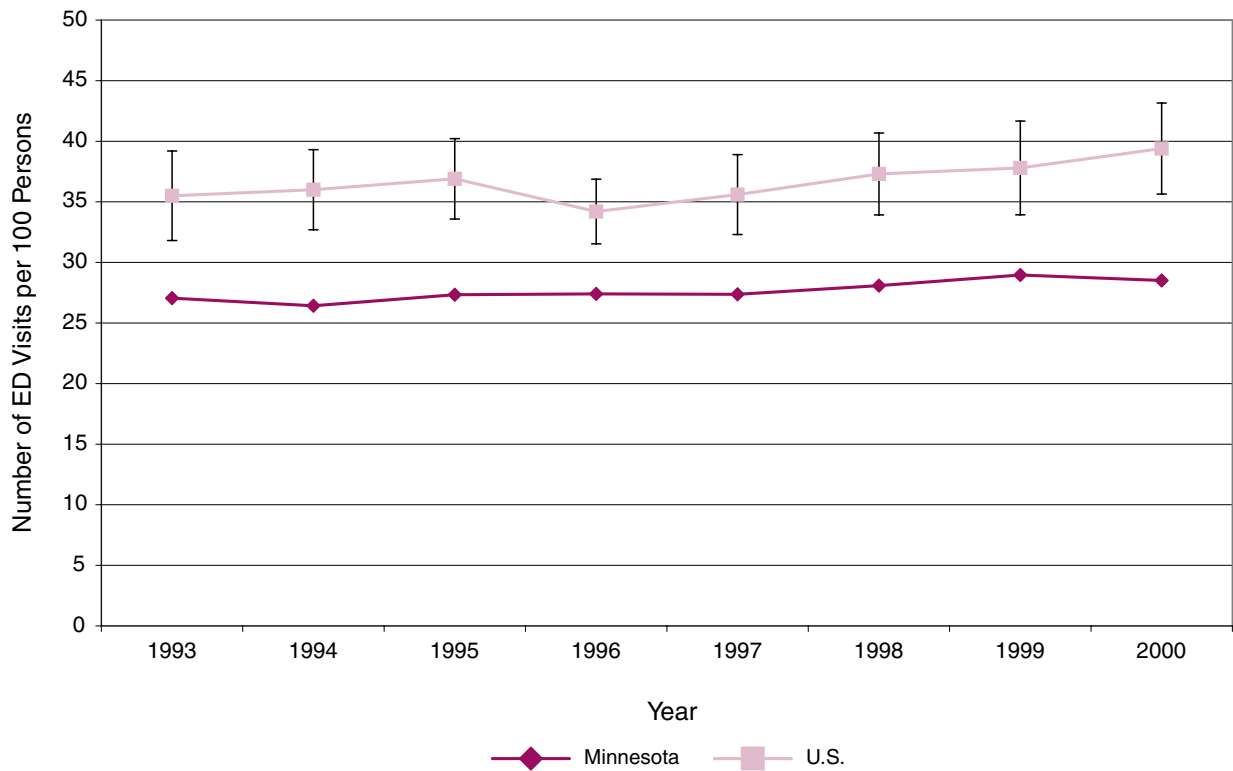
Data Sources: MDH Health Care Cost Information System; National Hospital Ambulatory Medical Care Surveys.

### Hospital Emergency Departments

Minnesota’s hospital emergency department (ED) visit volume grew 14.6% from 1993 to 2000, rising from 1.2 million visits to 1.4 million visits (Figure 28). Over the same period, the number of U.S. ED visits grew 19.6%. There were also differences in the rate of ED use between the state and nation, holding population size constant.

Figure 29

Minnesota and U.S. Trends in Hospital Emergency Department Visit Rates, 1993 - 2000



Data Sources: MDH Health Care Cost Information System; National Hospital Ambulatory Medical Care Surveys; U.S. Census July 1 population estimates.

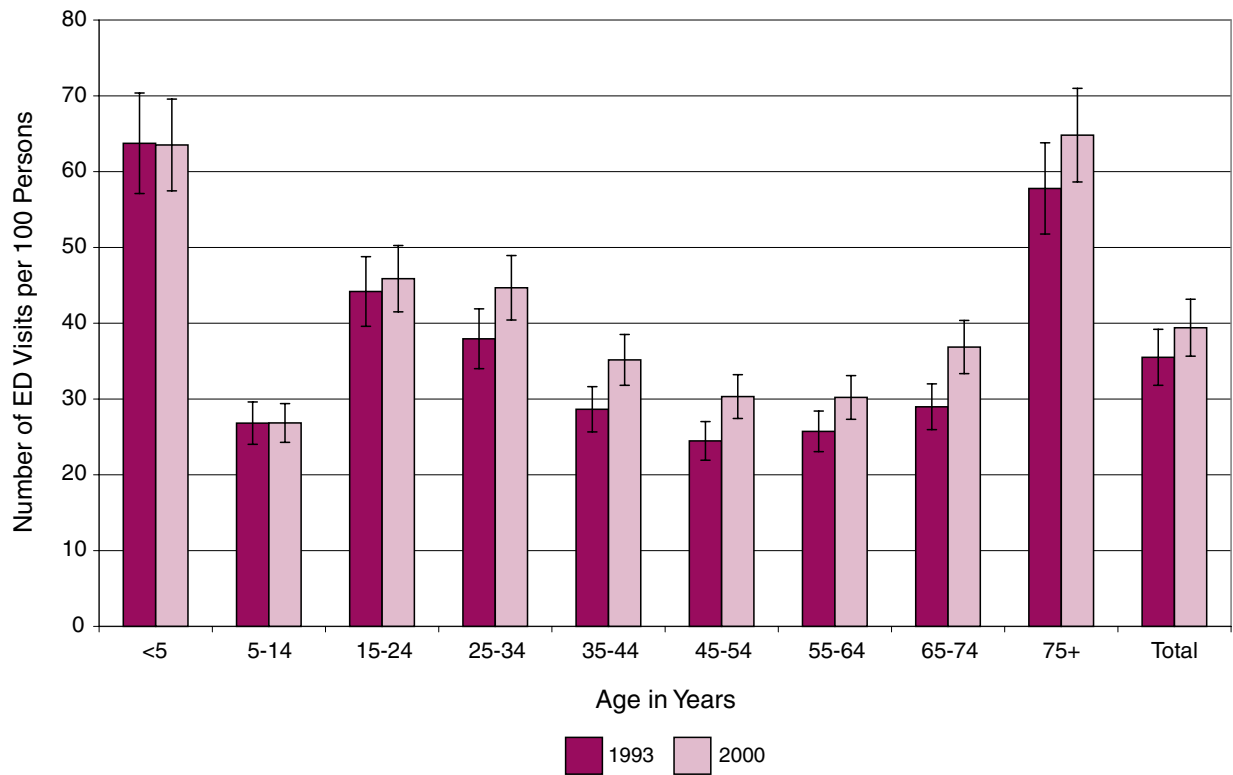
Note: Data collection methods and time periods vary with data source.

U.S. confidence interval at 95%

Figure 29 shows that Minnesotan's rate of using ED services was below that of the nation from 1993 to 2000. The figure also indicates there was no statistically significant change in the number of U.S. emergency department visits per 100 persons over the period studied. Minnesota's ED visit rate per 100 persons was 27.1 in 1993 compared with 28.5 in 2000, a 5% increase over the period. The Minnesota trend line was much flatter than the U.S. indicating that there was less variability in the state's ED use rate than the nations'.

Figure 30

### U.S. Hospital Emergency Department Visit Rates by Age Group, 1993 versus 2000



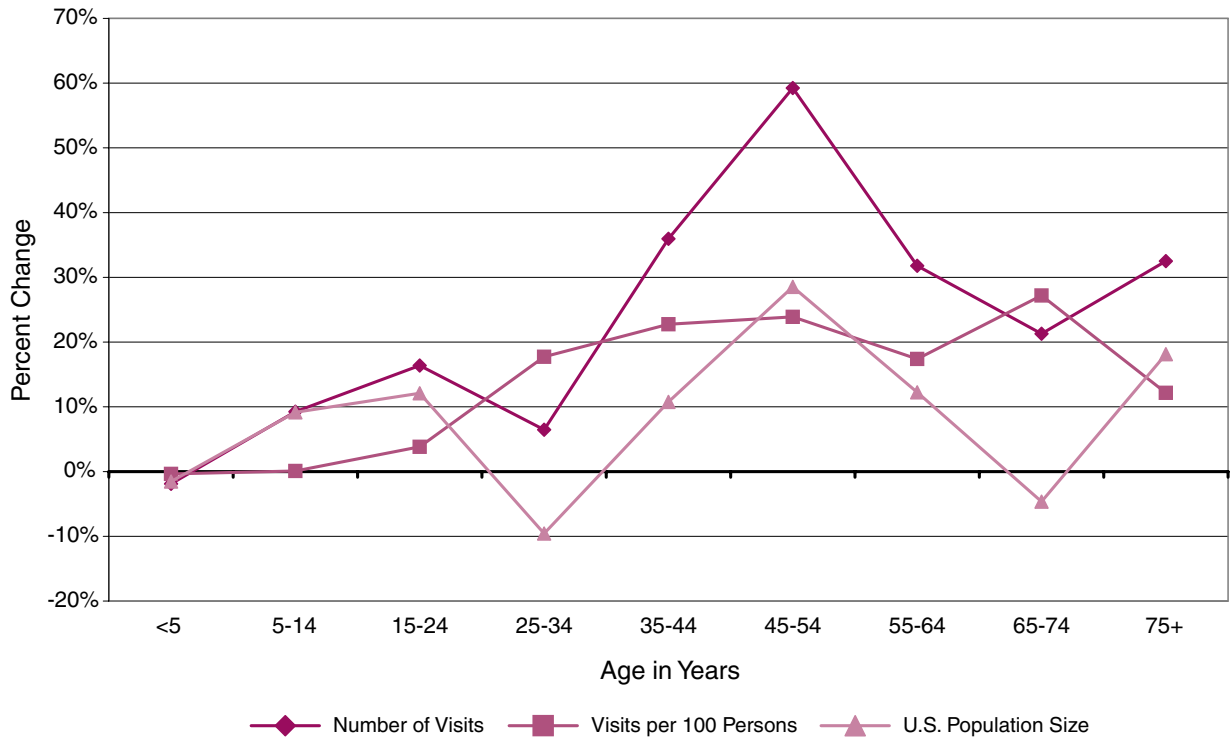
Data Sources: National Hospital Ambulatory Medical Care Surveys; US. Census July 1 population estimates.

Note: Confidence intervals at 95%

Rates of using Emergency Department services across the U.S. were highest among young children less than 5 years old and senior citizens 75 years of age and over, as seen in Figure 30. There were also some significant increases in ED visit rates within other age groups. From 1993 to 2000, there was a statistically significant increase in the number of ED visits per 100 persons for those ranging in age 35 to 44 years, 45 to 54, and 65 to 74 years of age. The reasons for these increases were unclear without further study.

Figure 31

Percent Change in Number of U.S. Hospital Emergency Department Visits, Visit Rate, and Population Size by Age Group 1993 to 2000



Data Sources: National Hospital Ambulatory Medical Care Surveys; U.S. Census July 1 population estimates.

As with the previous hospital services analyzed, Figure 31 demonstrates that the utilization of Emergency Department services was influenced by population size. Changes in age group size in conjunction with changes in the rate of ED use rate acted to increase or decrease the overall number of ED visits. Note that the Baby Boomers were among those experiencing an increase in ED visits, which was amplified by an increase in the rate of ED use. It is unclear, without further study why, there was an almost across the board increase in the rate of ED use, but the change was most notable during the middle years of life.

### Section Conclusions

The number of hospital outpatient visits in Minnesota rose by nearly 2 million between 1990 and 2000, a 51% increase. This stands as a countertrend to a decreasing number of patient hospital days over the period. While the rate of outpatient use rose 34%, the rate of patient day use dropped 27%, suggesting the substitution of hospital ambulatory care for inpatient care, a trend that likely was influenced by the growth of managed care over the decade. Minnesota appears to have led the United States in this regard. Of the three categories of ambulatory care monitored by MDH in Minnesota, ambulatory surgery displayed the greatest volume growth between 1993 and

2000, followed by all other outpatient services, and then emergency department visits. As a proportion of the total hospital outpatient mix, ambulatory surgery remained at nearly the same level over the analysis period.

Acute health problems and routine care for chronic problems were the two leading reasons for hospital outpatient visits in the U.S. during 2000. Minnesota's growth of non-emergency hospital outpatient volume outpaced the nation between 1993 and 2000 (34% versus 25%). Nationally, age groups with significantly more outpatient visits between 1992 and 2000 were those 5 to 14 years, and for all age groups beginning with those 45 to 54 years of age, and then up. Rates of ambulatory service use significantly increased for those 5 to 14 years, 55 to 64 years, and 65 to 74 years across the U.S. as a whole. Two of the most likely factors explaining the growth in hospital outpatient services, were population increases in combination with age shifts, amplified by significant increases in the rate of service use within several key age groups.

Hospital emergency department visits in Minnesota grew nearly 15% between 1993 and 2000, with the number of visits rising to 1.4 million in 2000, an increase of 178,000 from 1993. The Minnesota rate of ED use increased only 5%, remaining relatively flat over the study period and below that of the nation. In contrast, the number of U.S. visits for the same period rose nearly 20% and there was no significant change in the overall U.S. use rate across the period. The rates of highest emergency department use in the U.S. were among the youngest and oldest citizens, those less than 5 years old and 75 years of age and older. Increased rates of use were also found for those 35 to 54 years and 65 to 74 years of age. Emergency department volume, too, like other health services was influenced by changes in population size, the age distribution of the population, and changes in the rate of use among specific age groups. Reasons for the increased rate of use during the middle years of life remain unclear without further study.



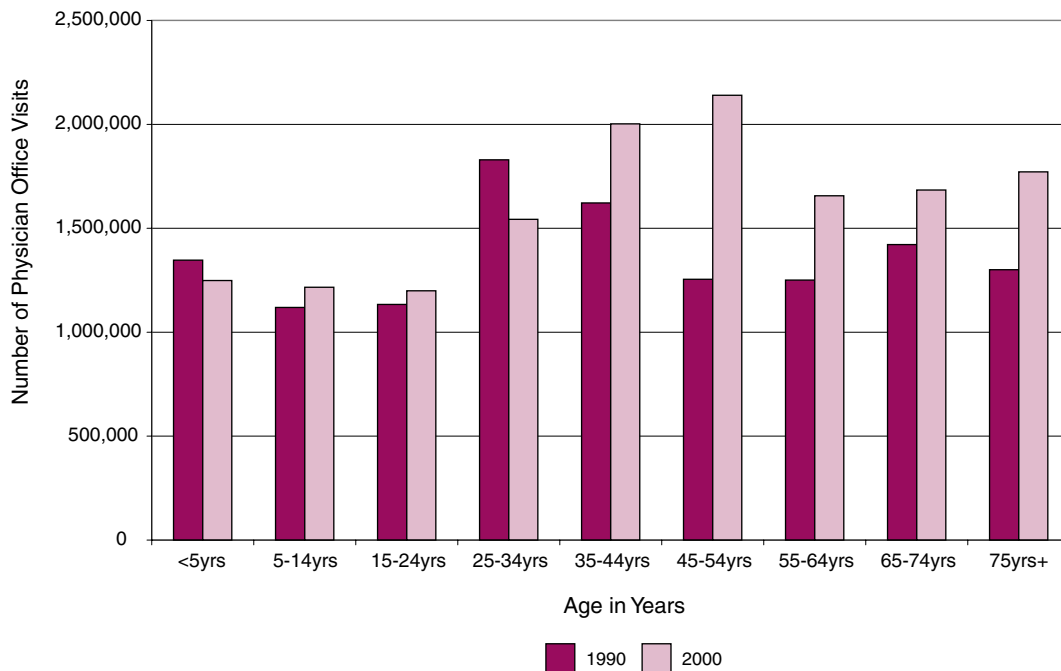
# 5 Physician Office Visits

Because MDH lacks detailed information about resident utilization of office-based physician services in the state, data from the National Ambulatory Medical Care Surveys (NAMCS) are used to describe national trends that may have applicability for Minnesota. Because NAMCS has been conducted annually since 1989, it is possible to combine U.S. estimates of the number of physician office visits per 100 persons with Census estimates of Minnesota's population size to obtain a rough estimate of the number of physician office visits in the state for a given year.

If Minnesota residents used physician services at the same rate and in the same way as the nation in 1990 and 2000, then it is estimated that 12.3 million physician office visits were made in the state during 1990 versus 14.6 millions in 2000. That's an almost 19% increase in the estimated number of visits. Of the nearly 19% increase, 5.8% of it was due to changes in the rate of use among some age groups, while 12.1% was due to population growth in Minnesota. Less than 1% was due to other unknown factors.

Figure 32

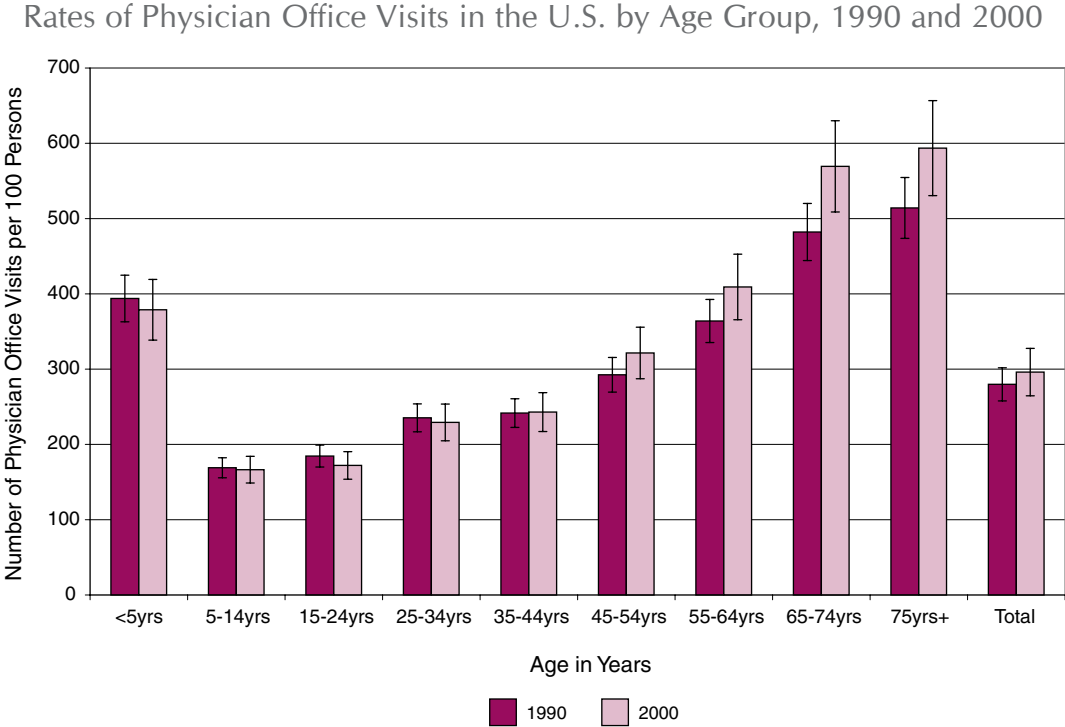
Estimated Number of Minnesota Physician Office Visits by Age Group, 1990 and 2000



Data Sources: National Ambulatory Medical Care Surveys; U.S. Census July 1 Minnesota population estimates.

Figure 32 provides the estimated number of physician office visits in the state by age group for both 1990 and 2000. Paralleling the Minnesota population age distributions shown in Figure 3, increases in the number of visits between 1990 and 2000 for persons 35 to 44 years and 45 to 54 years of age reflected the movement of the Baby Boom generation through the life cycle. Further increasing the number of visits between the two years were rising use rates for all age groups over 45 years, although there was no statistically significant difference in the U.S. physician office visit rates within age groups, as seen in Figure 33.

Figure 33

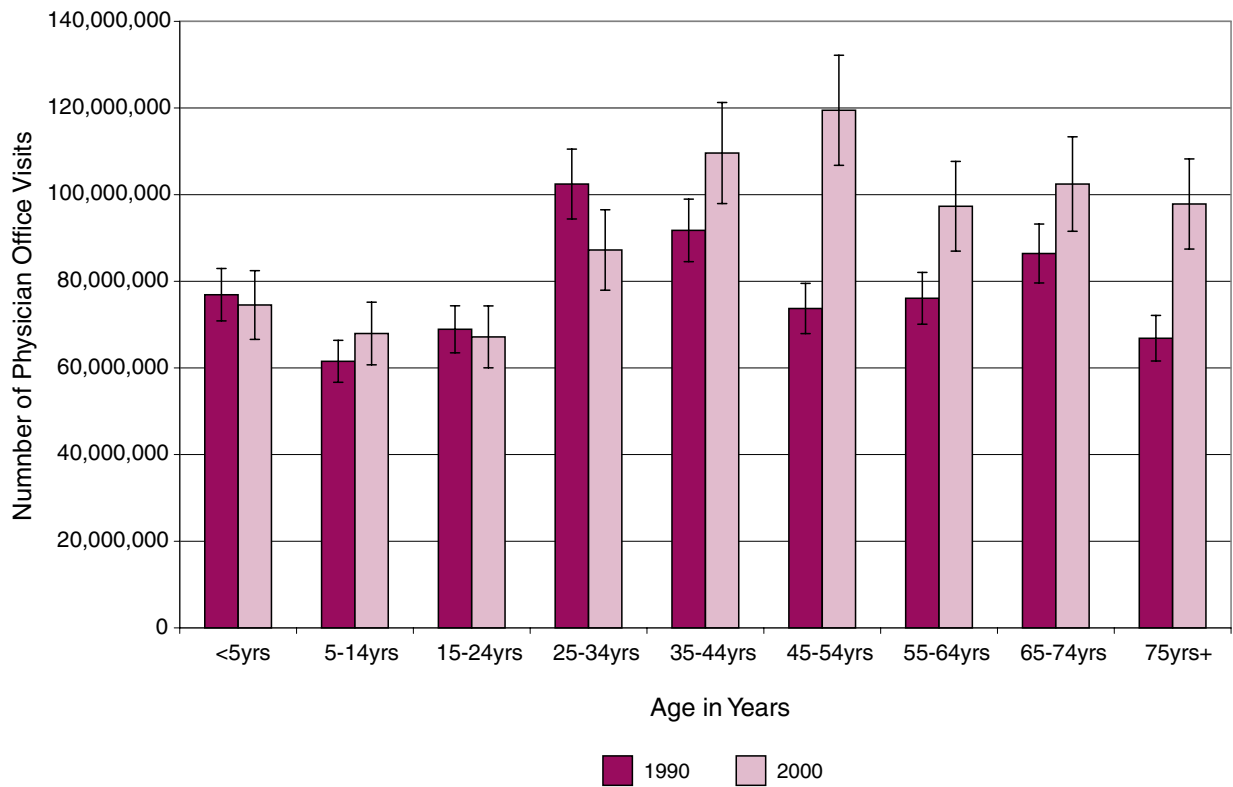


Data Sources: National Ambulatory Medical Care Surveys; U.S. Census July 1 population estimates.



Figure 34

Number of U.S. Physician Office Visits by Age Group, 1990 and 2000

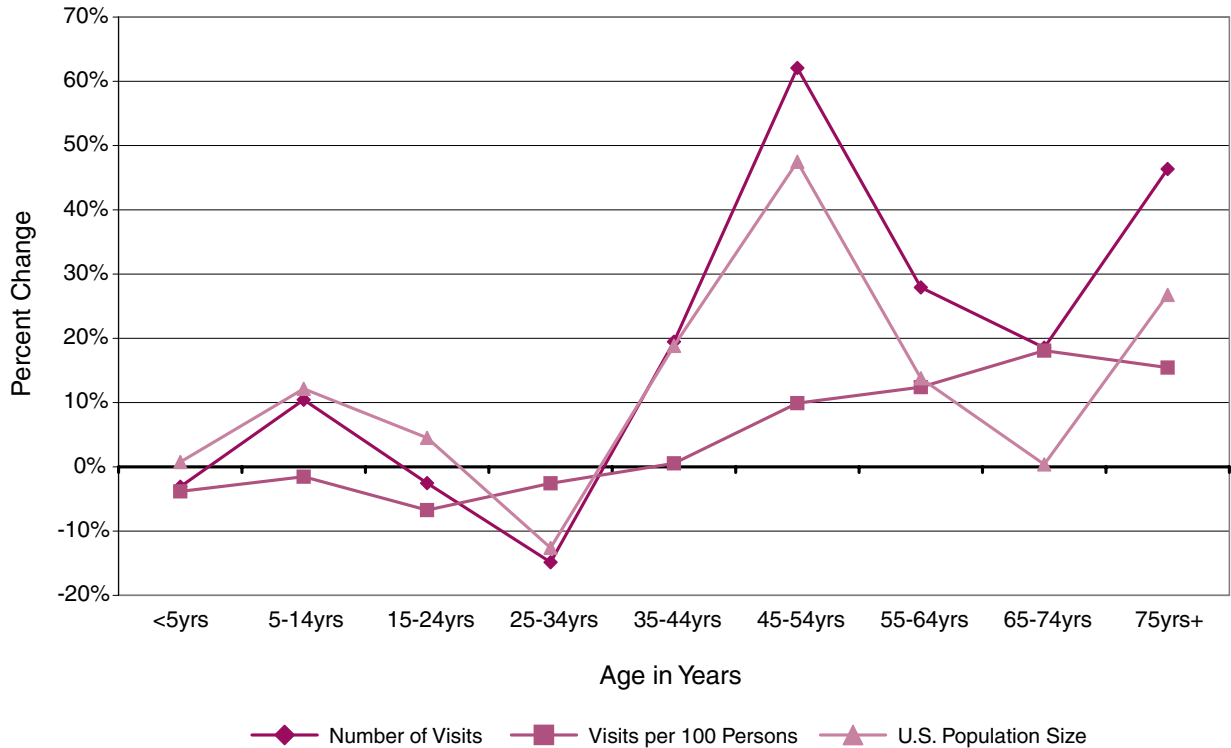


Data Source: National Ambulatory Medical Care Surveys.  
Note: Confidence intervals at 95%

Across the nation, there was statistically significant growth in the number of U.S. physician office visits for three age groups between 1990 and 2000. Figure 34 reveals that people 45 to 54 years (the older Baby Boomers), 55 to 64 years, and 75 years and up, made more visits in 2000 than those the same age during 1990. A perspective on the forces behind those changes appears in Figure 35.

Figure 35

Percent Change in Number of U.S. Physician Office Visits, Visit Rates, and Population Size by Age Group, 1990 to 2000

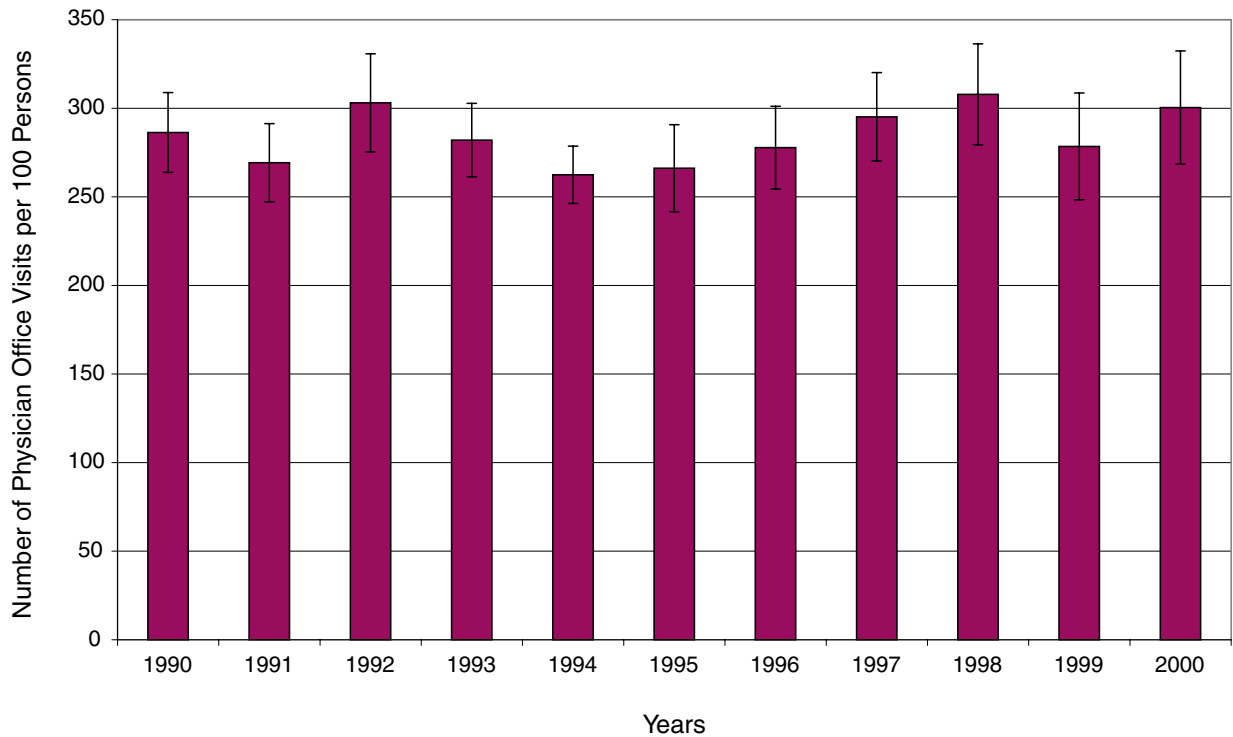


Data Sources: National Ambulatory Medical Care Surveys; U.S. Census July 1 population estimates.

Figure 35 shows that the rate of change in the number of U.S. physician office visits between 1990 and 2000 was, like all the previous health services studied, a function of the rate of change in population size conditioned by changes in the rate of use (number of physician visits per 100 persons). The Baby Boom cohort moving through the population age distribution was responsible for the large rate of increase among 45 to 54 year olds with those 75+ years also displaying a strong increase in population size as well as an increase in use rate. Together, these factors resulted in a 46% increase in the number of physician office visits nationwide. Conversely, as population size declined and steady, or slightly lower, use rates occurred, this led to declines in the number of U.S. physician office visits, except for children and adolescents 5 to 14 years old.

Figure 36

Trend in the U.S. Physician Office Visit Rates, 1990 – 2000

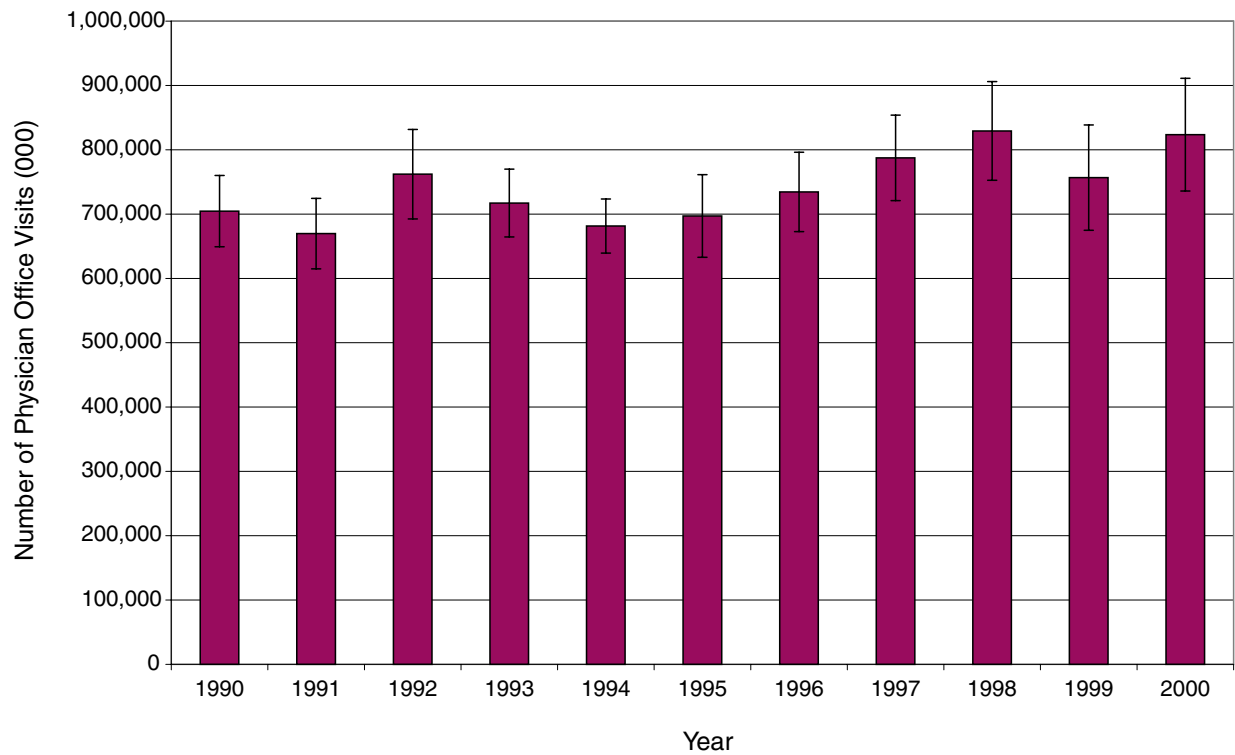


Data Sources: National Ambulatory Medical Care Surveys; U.S. Census July 1 population estimates.  
Note: Confidence intervals at 95%.

Fluctuations in physician office visit rates in these data reflect the dynamic interplay of multiple factors operating in the health care industry as well as the national surveys' design. Figure 36 tracks these variations, some of which maybe related to such things as health care market incentives, changes in payment policies, managed care practices, the breadth and depth of the prevalence of patient co-payments in the samples, as well as the mix of physicians in the sample, year-to-year sampling variability, patient preferences, and a host of other unknowns. There were no significant differences in overall number of physician visits per 100 persons across the study period, with the possible exception of 1994 versus 1998, but it is unclear what such a finding would mean. It is likely, that had Minnesota data been available for the same period, similar fluctuations in state-specific rates would be observed.

Figure 37

Trend in the Number of U.S. Physician Office Visits, 1990 to 2000



Data Sources: National Ambulatory Medical Care Surveys.  
Note: U.S. Confidence intervals at 95%.

Figure 37 exhibits estimates of the nominal number of physician office visits made year-by-year in the U.S. over the decade. The trend somewhat mirrors that seen in Figure 37. There appears to be little statistically significant difference in the overall use rate across time, but there were significant differences in age-specific use rates that also contributed to the nominal growth in the number of physician visits. Overall, the estimated number of U.S. physician office visits increased nearly 17% between 1990 and 2000, but this difference was not statistically significant, meaning it could have occurred by chance. While it appears there were more visits during 1998 (nearly 6 million more than in 2000), the size of the estimate could be due to sampling variability.

## Section Conclusions

Given that Minnesota physician office visit data are not systematically collected in the state, an approximation of state activity, which assumes that age-specific national use rates were similar to those seen in Minnesota, suggests there were more physician office visits in 2000 than in 1990. There were likely 2.3 million more visits provided during 2000 than in 1990 in Minnesota. Nearly 6% of the increase was due to an increase in use rates among certain age groups, while 12% was

due to population growth. Less than 1% was due to unknown factors. Nationwide, there was no statistically significant difference in office visit use rates for any age group over the decade, but there was significant growth in the number of visits for three of the age groups, accounted primarily by population size changes in combination with changes in rates.



## 6 Service Substitution

The preceding descriptive examination of utilization trends for each of the three most costly health services sectors - hospital inpatient, hospital outpatient plus emergency department, and physician office visits - provide some insight into a few of the fundamental factors influencing use of the U.S. and Minnesota health care delivery systems. Hospital organizations, in most instances, operate inpatient, outpatient and Emergency Department service sectors and integrate the operations while frequently cross-subsidizing them in order to provide a full-range of services. While not always entirely separate, under capitated managed care arrangements, large physician groups have financial incentives to substitute their own ambulatory services for those provided at hospitals, whether inpatient, outpatient, emergency department, or some combination. For example, some large clinic organizations own technology similar to that installed at hospitals, with CT, MRI, PET, and/or SPECT<sup>q</sup> scanners representing one domain. In some locales, hospitals and physicians are partners in the imaging business.

Other examples include physician investments in freestanding ambulatory surgery centers offering certain diagnostic and surgical procedures that were formerly performed at hospitals. Plastic surgery, some ear, nose and throat procedures, arthroscopic examinations, hernia repairs, eye surgery, diagnostic imaging, infusion therapies, and other diagnostic procedures are all examples of this potential for change in the site of care provision. Additionally, clinic-based Urgent Care competes with some hospital Emergency Departments (ED) services. Numerous hospital EDs have implemented *fast track* or *rapid care* services for non-urgent conditions to minimize emergency room crowding and patient waiting times. Patients' clinical status and readily observable conditions are triaged upon arrival at the hospital, then directed to either the fast track/rapid care service or the emergency service, both located on site.

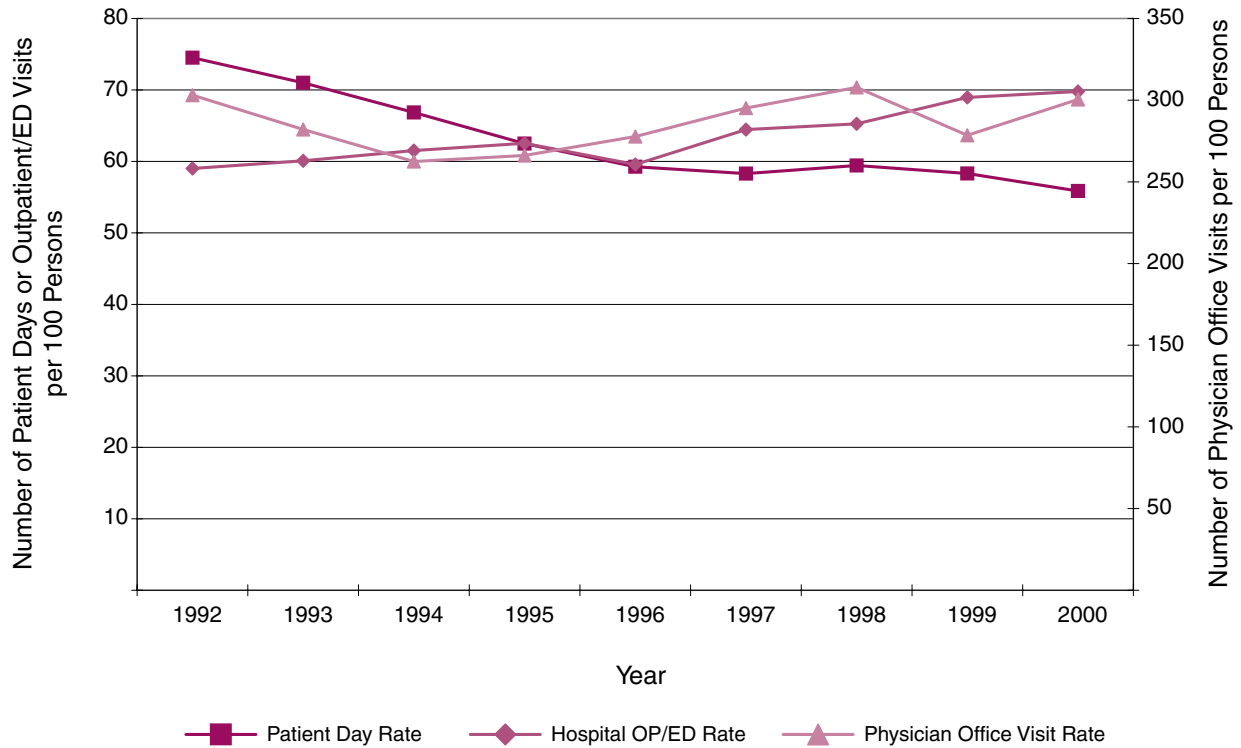
It has long been the goal of large, integrated health systems, especially those with their own insurance entity, to better coordinate all the services to reduce delivery fragmentation so that not only improvements in patients' health can be realized, but that lower costs will result through economies of scope and scale. HealthPartners is the remaining Minnesota example of such a system while Kaiser Permanente represents an integrated system with national scope.

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<sup>q</sup> CT - Computed Tomographic Scanner  
MRI - Magnetic Resonance Imaging  
PET - Positron Emission Tomography Scanner  
SPECT - Single Photon Emission Computerized Tomography Scanner

Figure 38

Trends in U.S. Patient Day, Hospital Outpatient/Emergency Department, and Physician Office Visit Rates, 1992 – 2000



Data Sources: National Hospital Discharge Surveys; National Hospital Ambulatory Medical Care Surveys; National Ambulatory Medical Care Surveys; U.S. Census July 1 population estimates.

Absent comprehensive Minnesota-specific information for analysis, data points from the national annual utilization surveys<sup>r</sup> were graphed in Figure 38 to roughly examine whether there was some correspondence among the rates of service use across time. For simplicity, hospital outpatient and emergency department visits were combined into one hospital outpatient care rate to compare with hospital patient day and physician office visit rates. The time series begins in 1992 because that was the first year in which the National Hospital Ambulatory Medical Care Survey data collection occurred.

Figure 38 shows that hospital ambulatory care use rates rose as patient day rates declined from 1992 through 1995, much as discussed earlier. Physician office visit rates also declined during that period. For the balance of the decade, however, hospital patient day rates continued to decline, although at a much slower pace, while both the rates of hospital outpatient care and physician office visit use strongly increased. In general, there was to be an inverse relationship between the

<sup>r</sup> These include the National Ambulatory Medical Care Surveys, National Hospital Discharge Surveys, and National Hospital Ambulatory Medical Care Surveys.

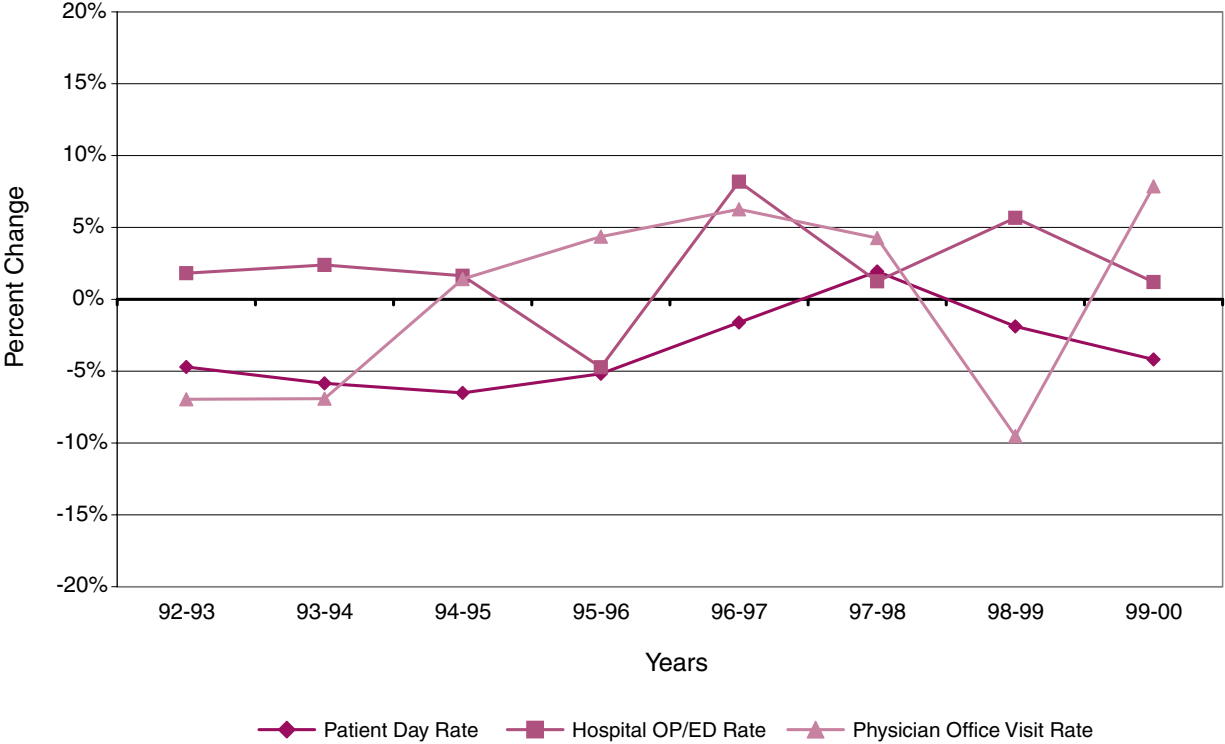


hospital patient day rate and the hospital outpatient visit rate across time, as described earlier. In other words, as the number of hospital patient days per 100 persons declined, the number of hospital outpatient visits per 100 persons increased. The relationship between the physician office visit rate and the other two use measures was more complex.

From 1992 through 1994, the physician office visit rate declined with the hospital patient day rate while the hospital outpatient visit rate was rising. The fall in the physician office visit use rate bottomed out in 1994, then began to rise more in concert with the hospital outpatient visit rate from 1995 through 2000. While the shift from hospital inpatient services to outpatient was relatively clear, it appears that physicians and clinics were slower to take advantage of the trend, but once under way, patients' use of both ambulatory service sectors took off in 1996 and grew through 2000.

Figure 39

Percent Change in Patient Day, Physician Office Visit, and Outpatient/Emergency Department Rates, 1992 to 2000



Data Sources: National Hospital Discharge Surveys; National Hospital Ambulatory Medical Care Surveys; National Ambulatory Medical Care Surveys; U.S. Census July 1 population estimates.

Year-to year rates of change between 1992 and 2000 for each of the service sectors appearing in Figure 39 further support the interpretation of the nominal use rate trends in the previous figure. Both of charts provide some indication that ambulatory use rates at hospitals and physicians offices

increased while the hospital patient day rate declined across the U.S., with the physician offices joining the inpatient/outpatient shift later in time. Though crude, this information supports the service substitution hypothesis appearing throughout this report. Minnesota-specific hospital trend data, suggests service substitution began much earlier in the state and likely continues today.

## 7 | General Conclusions

Variation in health care utilization in Minnesota and the United States over the decade was influenced by a dynamic interplay of demographic changes, alterations and innovations in medical practice, and the substitution of ambulatory services for some inpatient services. While hospital costs continued to contribute to the recent jumps in overall health care spending, patient day volume in the U.S. and Minnesota during 2000 was still below that of 1990, primarily as a result of a decade long decline in average length of stay. The number of hospitalizations, in both Minnesota and the United States, was dependent upon by the size of the population and its age mix.

The Post World War II Baby Boom generation continues to age, but that aging has yet to add significantly to overall hospital patient days. The sheer size of this generation, however, will make its demands for inpatient care known by 2010 when the first of two ten-year segments of the twenty-year cohort reaches age 65, to be followed by another ten-year, but larger, segment beginning in 2020. Much of the increase in hospitalizations seen in Minnesota since 1995 has been the result of population growth through in-migration into the state and not the Baby Boom aging.

One of the most significant shifts in overall health care utilization occurred during the decade as the site of care delivery changed through the substitution of ambulatory or outpatient services for some inpatient services. The data show that as the patient day rate of use declined, there was an increase in both the hospital outpatient rate of use and the physician office visit use rate, with the shift of some formerly inpatient care to hospital outpatient settings leading the delivery of similar care in physicians' offices by several years.

Growth in the use of hospital outpatient care in Minnesota was composed of increases in the number of ambulatory surgeries, all other outpatient services, and emergency department visits. As a proportion of the total hospital outpatient service mix, outpatient surgery remained nearly constant over the period studied. Acute health problems and routine care for chronic problems were the two leading reasons for U. S. hospital outpatient visits in 2000. Minnesota's growth in non-emergency outpatient service volume outpaced the U.S. between 1993 and 2000. Hospital outpatient service volumes grew due to an increase population combined with increased rates of use by several population age groups.

Rates of using Minnesota's emergency departments (ED) changed little over the study period, rising only 5% between 1993 and 2000. But, this change produced 178,000 additional ED visits over 1993 levels in Minnesota. Across the U.S., the rates of highest ED use were for those in age groups

of less than 5 years old and those 75 years and older. Statistically significant increases in age-specific ED rates of use were found for three age groups between 1993 and 2000. Persons 35 to 44 years old, 55 to 64 years of age, and 65 to 74 years old visited the ED more often. It is unclear why this occurred without further study.

MDH estimates that there were 2.3 million more physician office visits made by state residents in 2000 than in 1990. This assumes that Minnesotans used physician services in the same way and at the same age-specific rates as the whole nation. Most of this growth in utilization was a result of population increases and age shifts followed by changes in the rates at which persons within specific age groups used physician services. It is important to note, however, that nationwide, there was no significant difference in physician visit use rates within any age group. While not statistically significant, there were sizeable increases in the numbers of visits for persons 45 years of age and up across the U.S.

The study further found that both hospital outpatient use rates and physician office visit rates rose while hospital patient day rates declined over part of the period studied. Such a pattern provides support for the service substitution hypothesis, a trend that continues despite the loosening of managed care restrictions on access to care. Service substitution involves specific services that were formerly provided to inpatients being delivered in ambulatory settings. Ambulatory care, both for physicians and hospitals' outpatient departments, remains a key focal point for providers' investment and subsequent revenue growth

## 8 | Endnotes

- <sup>1</sup> Health Economics Program, “Drivers of Health Care Spending Growth in Minnesota,” Issue Brief 2001-01, (February 2001), St. Paul: Minnesota Department of Health.
- <sup>2</sup> Levit, K, C. Smith, C. Cowan, H. Lazenby, and A. Martin, “Inflation Spurs Health Spending in 2000,” Health Affairs, Vol. 21, No. 1, pp 172-181.
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- <sup>4</sup> Pol, LG and RK Thomas. 1992. The Demography of Health and Health Care. New York: Plenum Press, pp 327-336.
- <sup>5</sup> Pol and Thomas, The Demography of Health and Health Care, p 328.
- <sup>6</sup> Pol and Thomas, pp 327-334.
- <sup>7</sup> State Demographic Center, “Migration a major factor in Minnesota’s population growth,” Population Notes, July 2002 OSD-02-98.
- <sup>8</sup> Zarabozo, C. “Milestones in Medicare Managed Care.” Health Care Financing Review Fall 2000, Vol. 22, No. 1.
- <sup>9</sup> National Center for Health Statistics, 2000 National Hospital Ambulatory Medical Survey Micro-data File Documentation. Hyattsville, MD: Centers for Disease Control and Prevention. [ftp://ftp.cdc.gov/pub/Health\\_Statistics/NCHS/Dataset\\_Documentation/NHAMCS/doc00.pdf](ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHAMCS/doc00.pdf). See page 103.



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