2002 Vermont Hospital Monograph Companion

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This report is a companion guide to the *Vermont Hospital Monograph Series*. It contains analysis of data about Vermonters hospitalized in Vermont, Massachusetts, New Hampshire, and New York.

This report would not be possible without the accurate reporting of hospital utilization by Vermont's fourteen acute care hospitals, the Veterans Administration Hospital in White River Junction, and organizations in Massachusetts (MA), New Hampshire (NH), and New York (NY) which provide hospital discharge data pertaining to Vermont (VT) residents' use of inpatient services in these states.

Vermont hospital data are collected by the Vermont Association of Hospitals and Health Systems-Network Services Organization under contract with the Vermont Division of Health Care Administration (HCA). Under an agreement with the HCA, the Vermont Department of Health (VDH) receives the data from VAHHS-NSO, merges it with data from MA, NH, and NY, and analyzes the data.

December 2005

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About the Data Used in This Report

Inpatient Data

- **Vermont is a pioneer** in the collection and analysis of hospital utilization data. The *Vermont Hospital Monograph Series* has been published annually in Vermont since 1975.

- **Vermont inpatient data** are for VT residents receiving services at VT acute care hospitals, the VA hospital in White River Junction, and acute care hospitals in MA, NH, or NY.

- **Vermont is compared to the US** in certain charts. The US inpatient data are from the National Hospital Discharge Survey (NHDS) conducted by the U.S. Department of Health and Human Services.

- **Newborn data are excluded,** while maternal records are included, in order to avoid counting hospitalizations for delivery twice. Newborns are defined using Major Diagnostic Category (MDC) 15, Newborns and other neonates with conditions originating in the perinatal period. This is standard practice in hospital utilization analysis.

Outpatient Procedure and Emergency Department (ED) Data

- **Outpatient procedure and ED data are not included in this report** because of recent changes in how we define and analyze these data. Analyses of these data will be provided in separate publications.

- **New definitions for outpatient procedure and ED data** have been developed.
  - **Outpatient procedure records** were previously selected (2001-2002) as records of patient type A (ambulatory surgery) which had ICD-9-CM procedure codes in the range 0-86.99. Recent analyses have shown that records for patients who received outpatient procedures in the correct range may be found in several patient types, including observation bed, series patient, and ED patient types.
  - **ED records** were previously identified as records of patient type E (ED visit) plus inpatient records whose admission source was designated as "emergency room." Recent analyses have shown that patients who came through the ED may end up in all of the assigned patient types, including inpatient, ambulatory surgery, observation bed, series patient (rarely), and ED. These records are more accurately identified by matching revenue records that show an ED charge.

Population Data

- **Vermont population data** are from the 1990 and 2000 U.S. Censuses, estimates produced for VDH by the Center for Rural Studies at the University of Vermont for the intercensal years 1991-1999, and estimates prepared for VDH by Claritas, Inc., for 2001-2002.

- **US population data** are from the U.S. Censuses and from Census estimates for July 1 of each intercensal year.

Part I: Inpatient Utilization

Highlights of Vermont Inpatient Utilization: The Challenges…

Rising medical costs are of concern nationally as well as in Vermont. This report hopefully sheds light on some of the issues that Vermonters will need to address related to controlling health care costs:

- **Inpatient care is costly.** As published in the *2002 Vermont Hospital Monograph Series* (page 407), the average cost of inpatient hospitalizations of Vermonters for 2002 was $11,808, more than four times higher than the average cost for a defined group of outpatient procedures ($2,599) and 25 times more costly than the average emergency department visit that did not result in hospitalization ($459).

- **Getting older means a higher likelihood of being hospitalized.** Vermonters age 65+ were three times more likely to be hospitalized than those age 45 to 64, and 16 times more likely to be hospitalized than children under 15 (newborns excluded). *See Figure 7 on page 11.*

- **Vermont's population is aging.** From 1990-2002, the percent of Vermonters aged 45+ grew from 30% to 39%. This was due in part to the aging of the Post World War II Baby Boom Generation born between 1946 and 1964. In 1990, none of the Baby Boomers had reached age 45. By 2002, about half were in their upper 40s and 50s. *See Figure 2 on page 6.*

- **Vermont's population is aging faster than the overall US and US white subpopulations.** Both the Vermont and US populations are growing (*see Figure 1 on page 5)*, but in 2002 Vermonters age 45 and above were a larger percent of the overall population than the US (*see Figure 3 on page 7).* According to Census figures for 2002, Vermont was the sixth highest state in terms of the percent of its citizens age 45 and above. In 2004, Vermont rose to third highest in percent of the population age 45 and above.

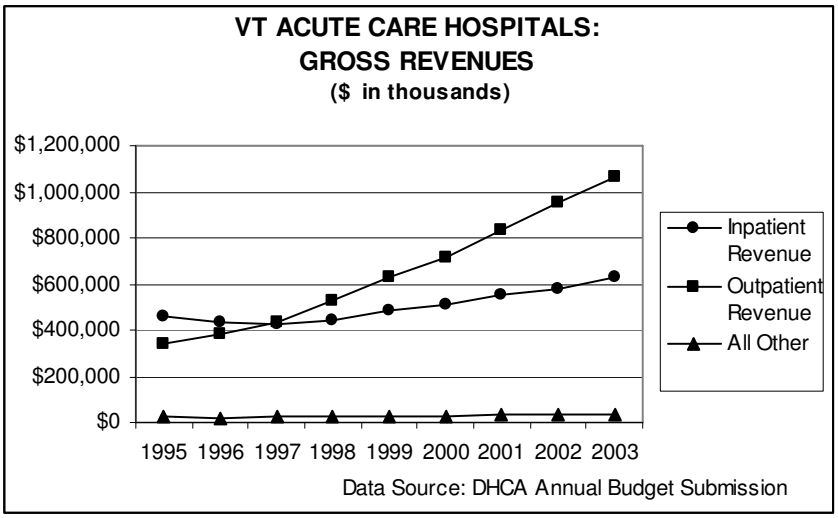
- **Chronic disease and health issues related to the aging process are related to the top four reasons for hospitalization of patients aged 45-64 and 65+.** Heart & circulatory, respiratory, musculoskeletal, and digestive diagnoses are the most common reasons for hospitalization for patients aged 45+. *See Figures 17 and 18 on pages 24 and 25.*

- **Conclusion:** With the aging of the Vermont population, more chronic conditions and age-related health problems can be expected with the potential for increasing costs.

Trends across Hospital Settings

- **Inpatient utilization is down.** In spite of the aging of Vermont's population, overall hospitalization, length of stay, and patient day rates decreased significantly between 1990 and 2002. *See Figures 4 through 6 on pages 8 through 10.* Factors influencing this decline include the shifting of some procedures from the inpatient to the outpatient setting and cost-containment processes put in place by providers and insurers.

- **Overall outpatient costs are up dramatically**. Between 1997 and 2003, Vermont hospital revenues for the full range of outpatient services, including ambulatory surgery, emergency department visits, and diagnostic testing, exceeded and outpaced growth in inpatient revenues. Outpatient revenues increased 143% while inpatient revenues increased 47%.



Connecting Chronic Disease to Cost and Utilization

- **New research connects health care cost increases to increases in obesity and chronic disease prevalence.** Kenneth Thorpe in a *Health Affairs* article entitled "The Rise In Health Care Spending And What To Do About It: Disease prevention/health promotion approaches are key to slowing the rise in health care spending" (November/December 2005, 1436-1445) concluded that key factors in the rise of health care spending are rising disease prevalence and new medical treatments. Specifically, he states that "much of the growth in health care spending over the past twenty years is linked to modifiable population risk factors such as obesity and stress."

New Opportunities

- **The Fit and Healthy Vermonters Obesity Prevention program** is a coordinated, comprehensive approach to promoting healthy eating and increasing physical activity among Vermonters. The obesity prevention plan provides strategies for schools, worksites, health care, public health agencies and early childhood programs, acknowledging that in order to achieve success change needs to take place at multiple levels of intervention. The initiative

will implement best practices and promising practices to address the determinants of behavior through multiple strategies, including (but not limited to):

- changing beliefs and attitudes through education and counseling,
- providing written information regarding healthy meals,
- developing buddy systems for physical activity,
- offering healthier food options in vending machines,
- expanding community gardens and farmers markets,
- increasing opportunities for physical activity by providing bike trails and safe walking routes, and
- enacting legislation that would require schools to have policies regarding foods served and sold and daily physical activity.

- **Vermont's "Blueprint for Health" chronic care initiative could help turn the tide on health care costs.** The Blueprint describes a comprehensive, proactive system of care that will help Vermonters prevent or better manage chronic diseases. Two communities (St. Johnsbury and Bennington) are piloting innovative changes in self care support, provider practices, and community interventions.
  - St. Johnsbury, Bennington, and three additional communities are offering a self-management workshop program developed at Stanford University called "Healthy Living with Chronic Disease," which has been demonstrated to significantly improve health outcomes.
  - The Blueprint describes ways to support physician practices, providing them with the information and tools they need to deliver health care that is consistent with evidence-based standards. The Rand Corporation recently reported that more than half of people with chronic conditions did not receive the care that they are known to need to manage their condition. This statistic could be improved if providers have information systems that support chronic disease prevention, treatment, and management and if the health care system invests in and rewards quality.
  - The Blueprint will work closely with the Fit & Healthy Vermonters initiative toward the goal of having all Vermonters live in communities that support healthy lifestyles.

Population Trends: United States and Vermont

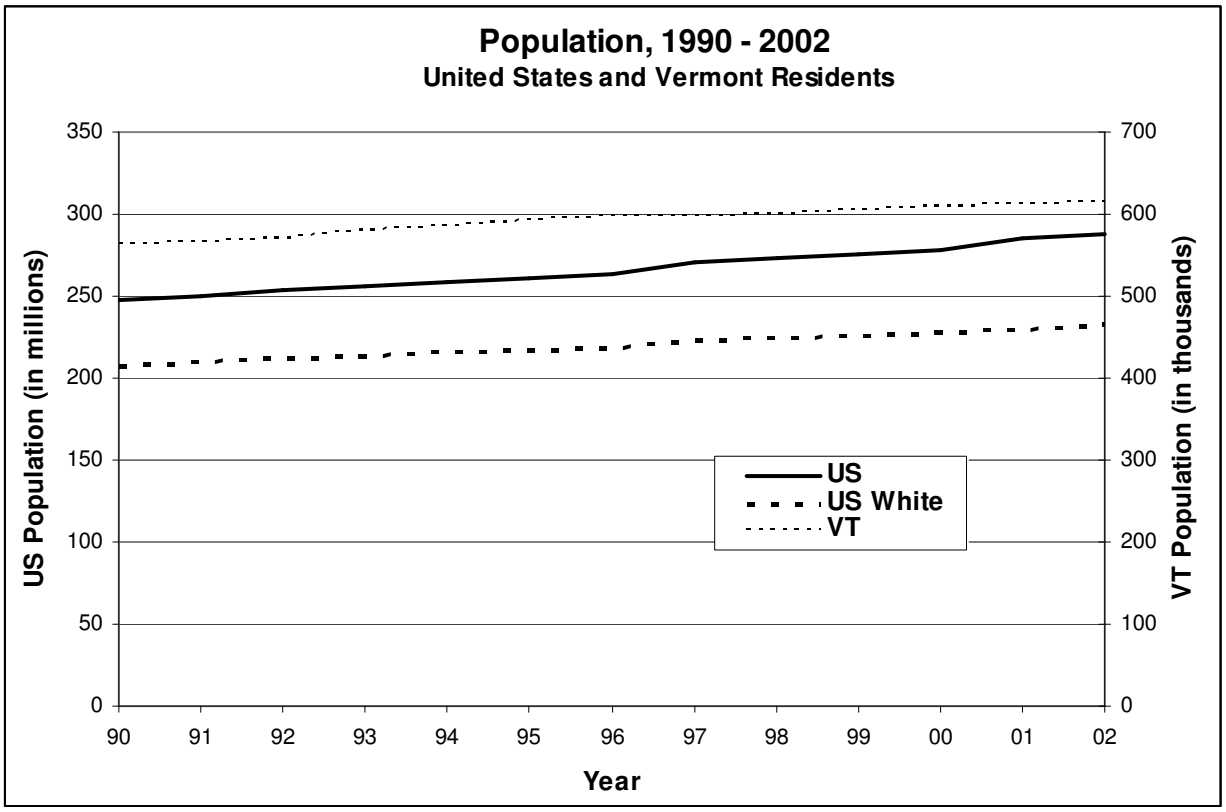


Figure 1

- **Vermont and US populations are growing.** The overall US population grew by 16% from 1990–2002. The US white subpopulation grew more slowly (11%) while Vermont grew more slowly still (9%).

- **Note: Data for Vermonters are frequently compared to the US subpopulation that identifies itself as white** since 96.8% of Vermonters categorize themselves as white. Differences in utilization rates among various ethnic/racial groups have been attributed to disparities in health status, socioeconomic status, and access to care.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Population Trends by Age: Vermont

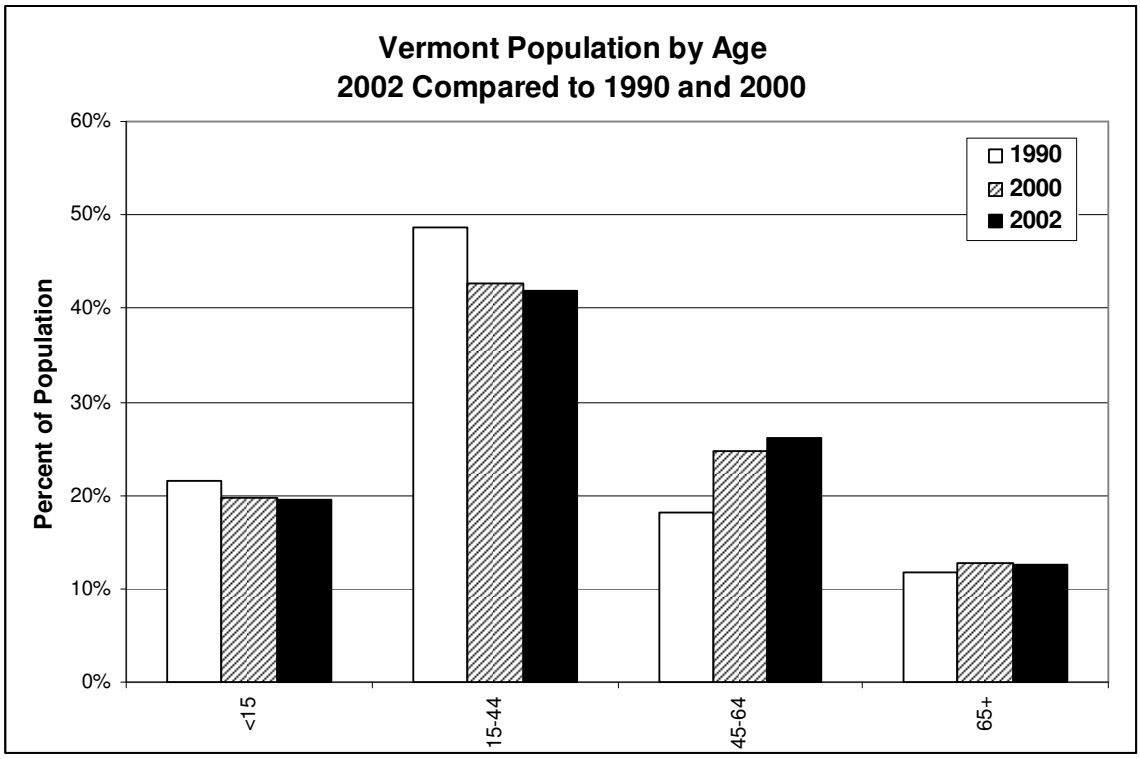


Figure 2

- **Vermont's population is aging.** The younger two age groups, children under 15 and individuals aged 15-44, decreased significantly as a percent of the overall population from 1990 to 2002, while the older two age groups increased significantly.

- **The population shift from the 15-44 year old group to the 45-64 year old group is consistent with the aging of the Post World War II Baby Boom Generation.** Baby Boomers (born between 1946 and 1964) were all younger than 45 in 1990. By 2002, about half of all Baby Boomers were in their late 40s and 50s.

- **Vermont's population will likely continue to age.** The large Baby Boom population group will all finally be age 45 and older in the year 2009. As the Baby Boomers age, the number of older adults with age-related medical problems and chronic diseases is likely to rise rapidly.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Population by Age: United States and Vermont

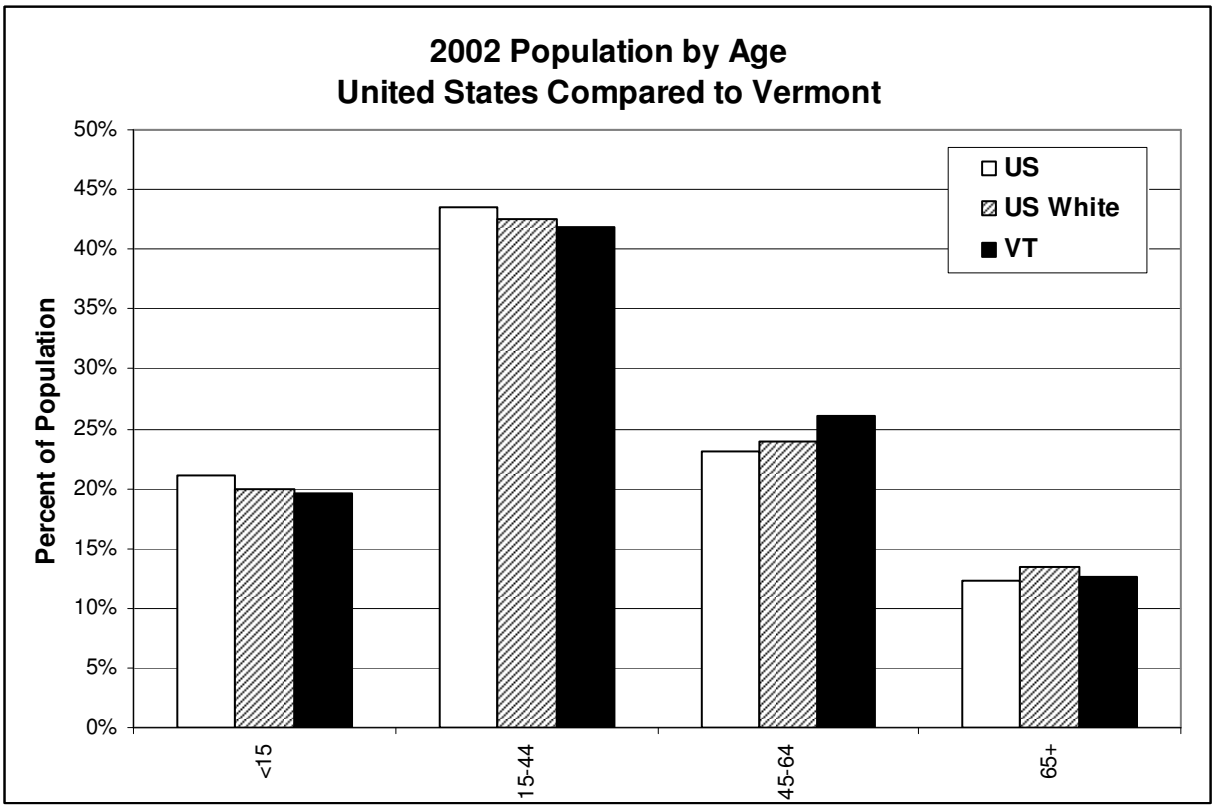


Figure 3

- **Vermont's population is aging faster than the US population.** As a percent of the overall population, Vermont's two younger age groups are smaller than the overall US and the US white populations. Vermont has a larger percent of its population in the 45-64 year age group than either the overall US or US white populations and has a larger percent age 65+ than the comparable overall US group (but a smaller percent than the comparable US white population).

- **In 2002, Vermont was the sixth highest state in terms of its percent of population age 45 and above.** In 2004, Vermont rose to third highest in the nation in the percent of its citizens age 45 and above.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Part I: Inpatient Utilization

Trends in Utilization: Discharge Rates

The age-adjusted discharge rate measures how often hospital care is provided in a population, adjusting for differences in age distribution.

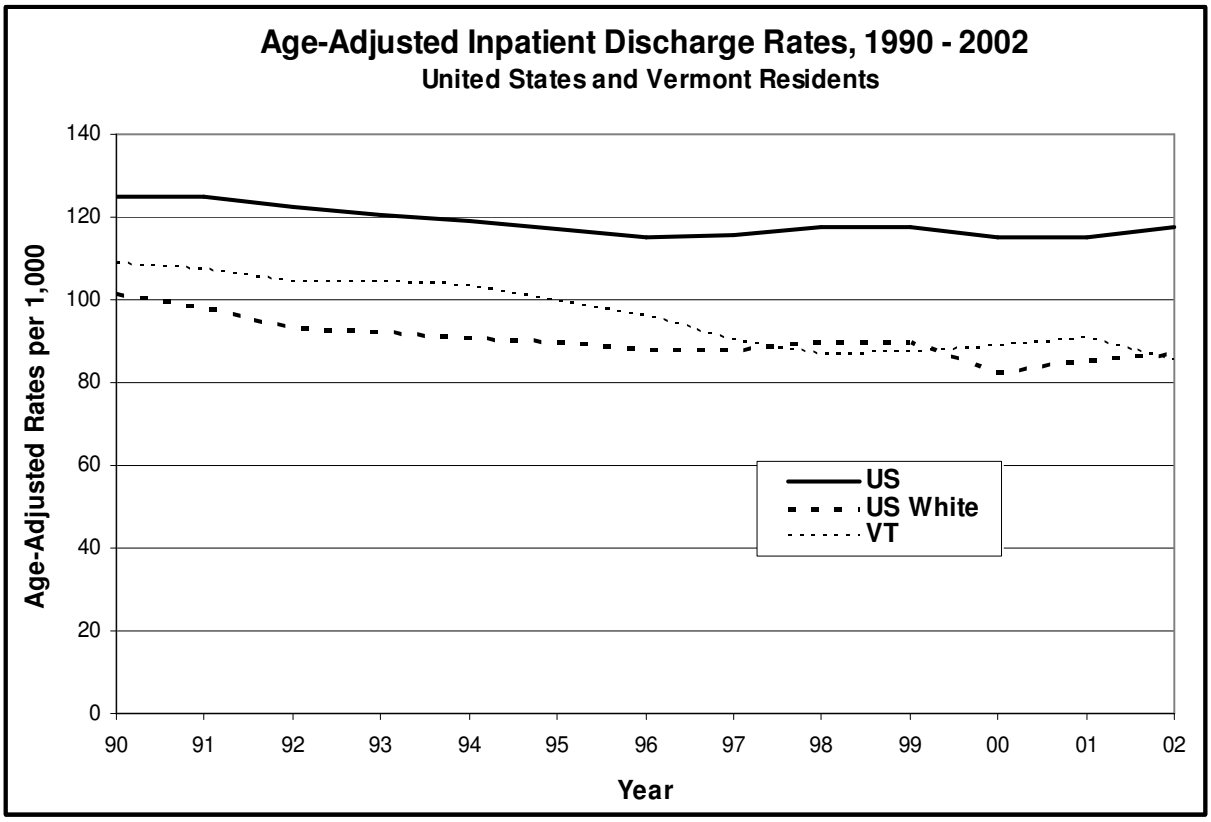


Figure 4

- **Vermont discharges are down.** In spite of the aging of Vermont's population, Vermont's hospitalization rate decreased significantly (-22 %) from 1990-2002. The rate declined fairly steadily from 1990-1999, due in part to the shift of some procedures to the outpatient setting. In 2000 and 2001, the rate rose slightly, but in 2002 the Vermont rate reached a new low.

- **Vermont is lower than the overall US, but similar to the US white subpopulation.** Vermont's discharge rate was significantly lower than the overall US rate every year from 1990-2002, but similar to the US white rate for most of the years (except 1992-1994).

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Trends in Utilization: Average Length of Stay Rates

The age-adjusted average length of stay is an approximate measure of the resources used per discharge, adjusting for differences in age distribution.

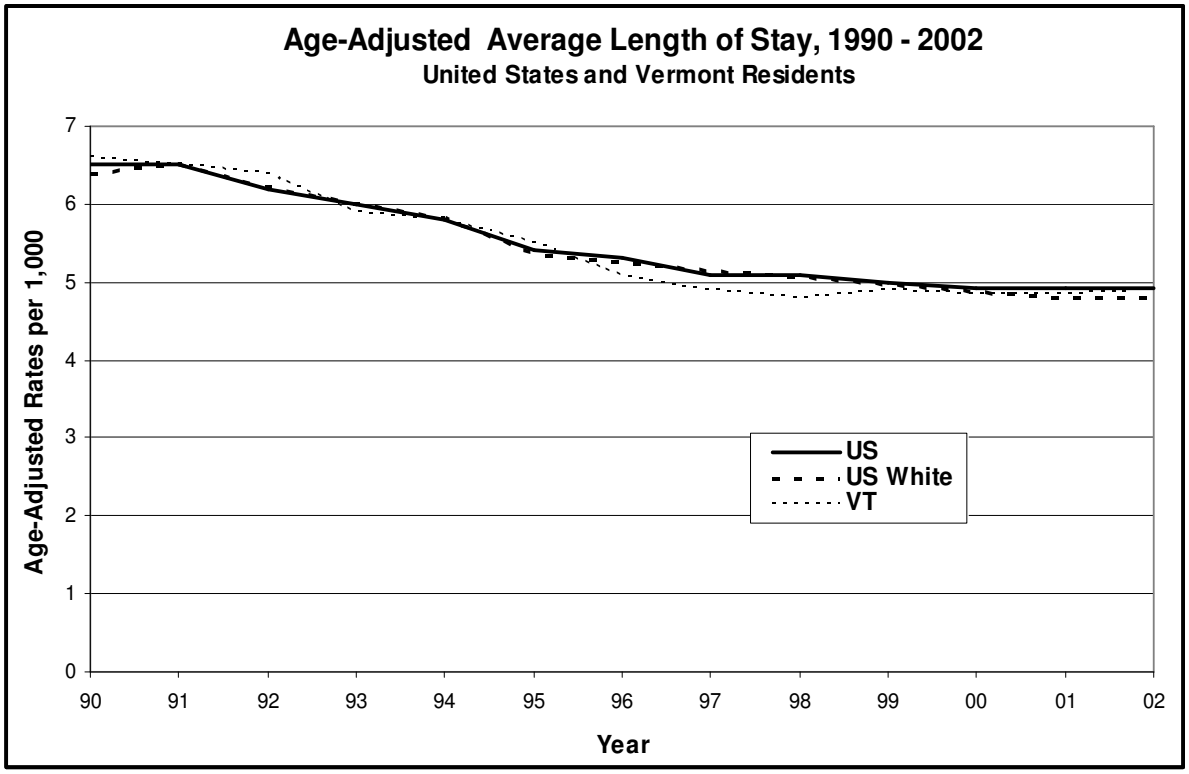


Figure 5

- **Vermont's length of stay is down.** Vermont's rate dropped significantly (-26%) from 1990-2002, probably due in part to cost-containment pressures from insurers. Similar drops occurred for the overall US rate (-24%) and the US white rate (-25%).

- **Vermont's length of stay is similar to both US rates.**

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Part I: Inpatient Utilization

Trends in Utilization: Patient Day Rates

Age-adjusted patient days are the total days of hospitalization within a population, adjusting for differences in age distribution. This measure reflects both the number and the length of hospitalizations and is closely associated with overall inpatient costs.

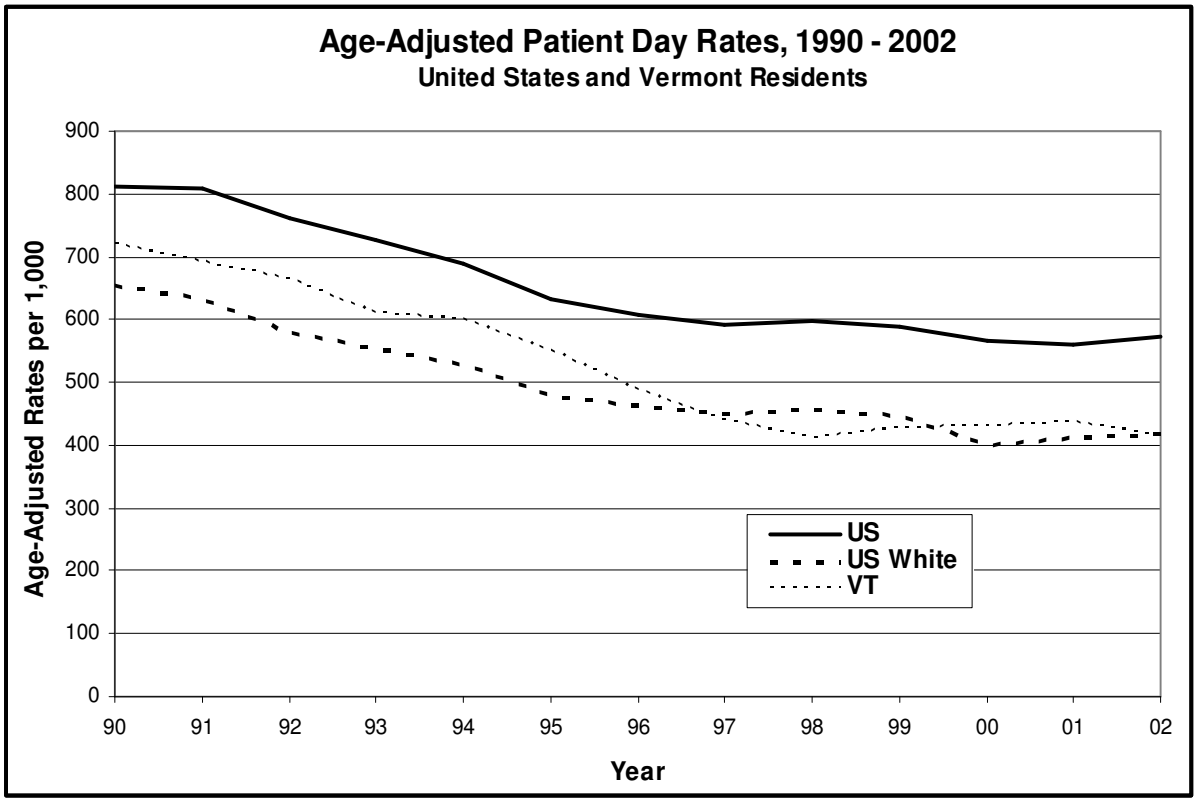


Figure 6

- **Vermont's patient days are down.** Vermont's rate decreased significantly (-42%) from 1990-2002 compared to the overall US rate decline of -30% and the US white rate decline of -36%.

- **As seen for discharges, Vermont's patient days are lower than the overall US, but similar to the US white subpopulation.** Vermont's patient day rate was significantly lower than the overall US rate every year from 1990-2002, but similar to the US white rate for most years (except 1992 and 1994).

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Patient Characteristics: Variations by Age

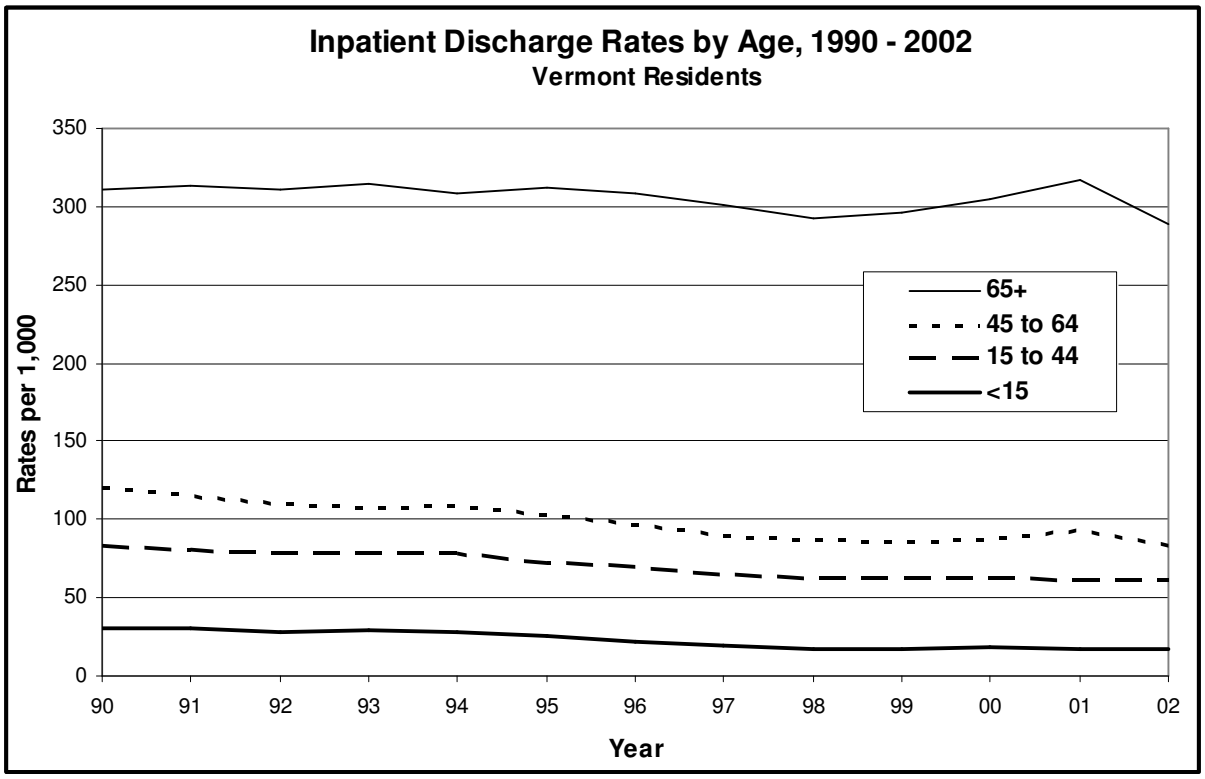


Figure 7

- **Getting older means a higher likelihood of being hospitalized,** reflecting the cumulative effects of the aging process and development of chronic diseases. Discharge rates for the four age groups were significantly different from each other across all years from 1990-2002.

- **Although Vermonters age 65+ were only 12.5% of the state's population in 2002, over 41% of 2002 discharges (excluding newborns) were for care of this group.**

- **Vermonters age 65+ are three times more likely to be hospitalized than 45-64 year olds and 16 times more likely to be hospitalized than children under 15.**

- **All age groups are hospitalized less now than in 1990.** The discharge rates for all age groups decreased significantly from 1990–2002.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Patient Characteristics: Variations by Sex

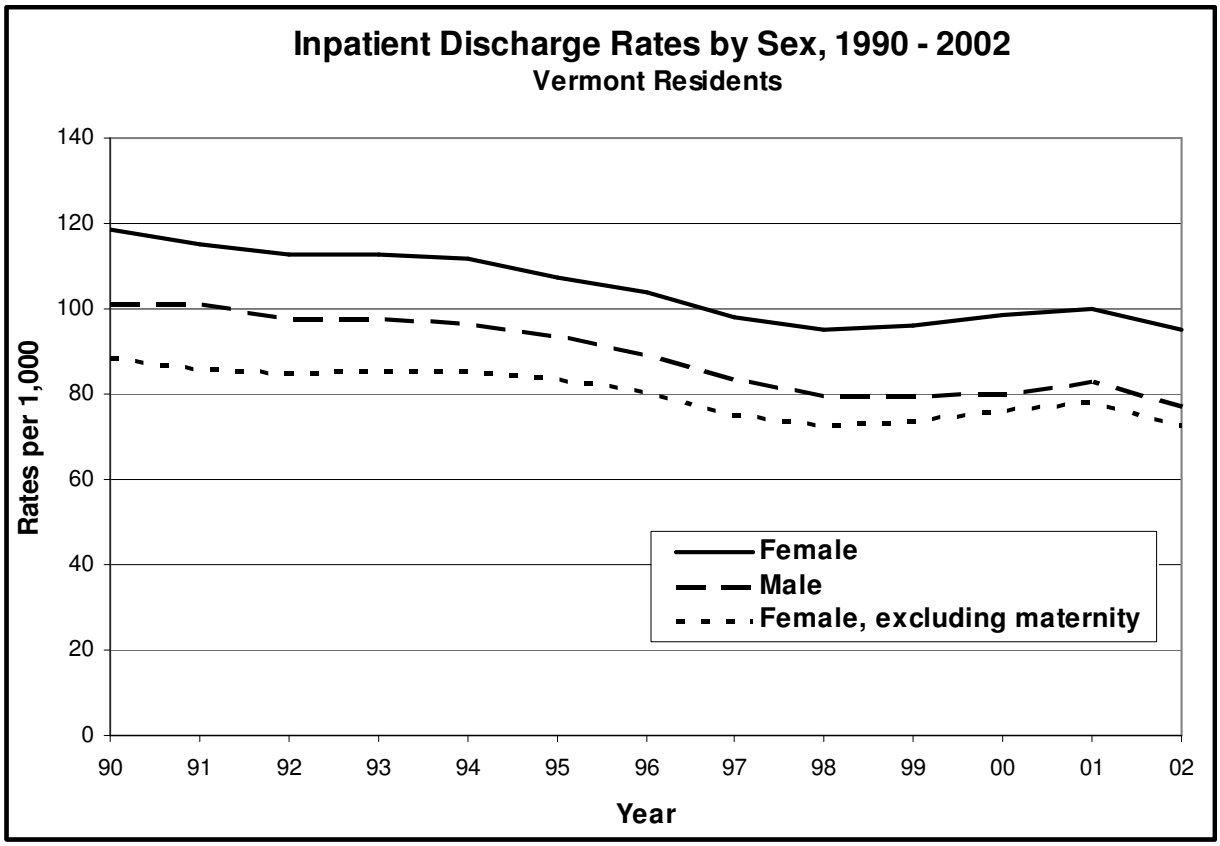


Figure 8

- **Females are hospitalized less than males** (when pregnancy and childbirth hospitalizations are EXCLUDED).

- **When pregnancy and childbirth hospitalizations are INCLUDED, females have higher discharge rates than males.**

- **Hospitalizations for both genders are down.** The rate for males decreased -24% from 1990-2002, the rate for all female hospitalizations decreased -20%, and the rate for females when pregnancy and childbirth hospitalizations were EXCLUDED decreased -18%.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Patient Characteristics: Variations by Age and Sex

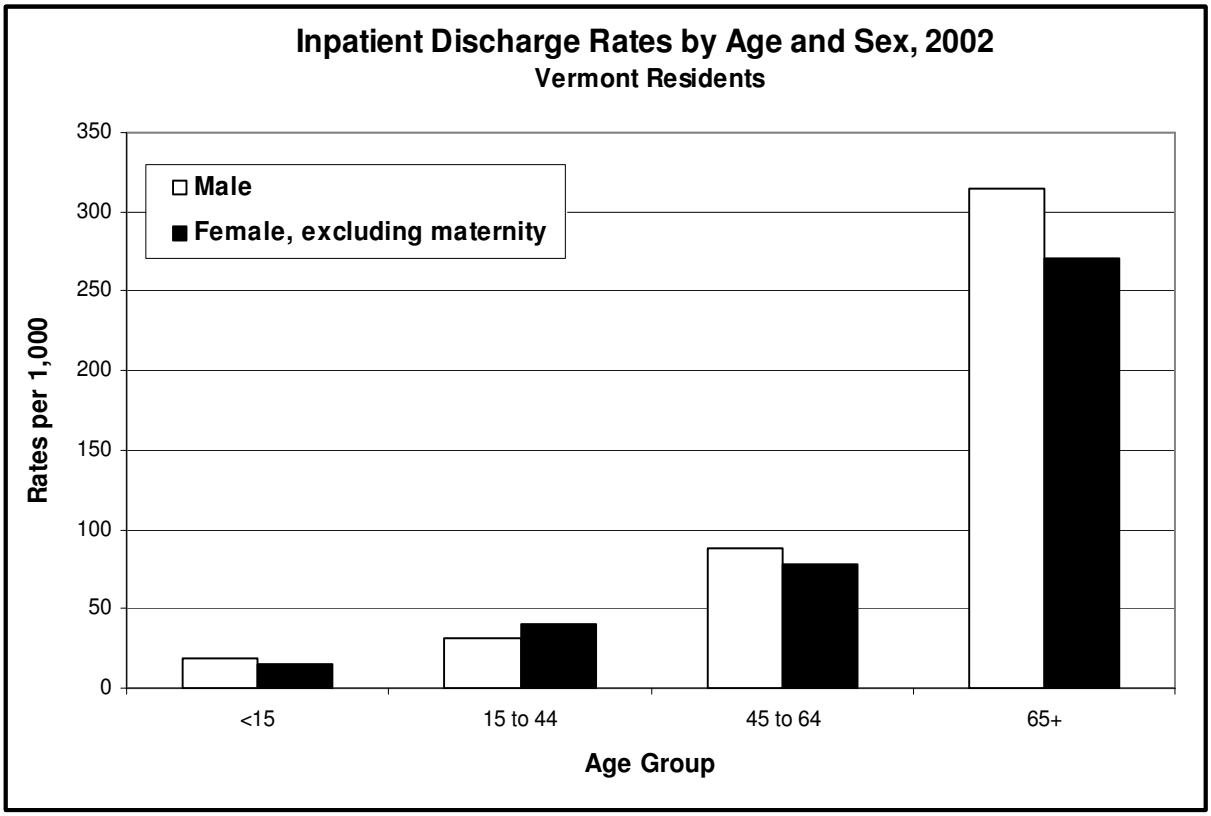


Figure 9

- **Females are hospitalized less than males in all age groups except ages 15-44** (even with hospitalizations for pregnancy and childbirth excluded).

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Part I: Inpatient Utilization

Reason for Hospitalization: Discharges by MDC

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

Table 1

Vermont Inpatient Discharges by MDC, Sorted by 2002 Volume							
	1990		2000		2002		
MDC	Dis-charges	% of Total Dis-charges	Dis-charges	% of Total Dis-charges	Dis-charges	% of Total Dis-charges	Percent Change 1990-2002
Heart & Circulatory	9,406	15.9	10,910	19.8	9,979	18.6	6.1
Pregnancy & Childbirth	9,476	16.0	6,754	12.3	6,602	12.3	-30.3
Respiratory	5,325	9.0	6,051	11.0	5,807	10.9	9.1
Digestive	6,026	10.2	5,460	9.9	5,502	10.3	-8.7
Musculoskeletal	6,377	10.8	5,136	9.3	5,450	10.2	-14.5
Brain & CNS	3,099	5.2	3,428	6.2	3,168	5.9	2.2
Mental Illness	2,177	3.7	2,861	5.2	3,093	5.8	42.1
Kidney & Urinary	1,969	3.3	1,735	3.1	1,690	3.2	-14.2
Female Reproductive	1,947	3.3	1,695	3.1	1,674	3.1	-14.0
Endocrine	1,425	2.4	1,539	2.8	1,628	3.0	14.2
Liver & Pancreas	1,811	3.1	1,445	2.6	1,439	2.7	-20.5
All Other	1,067	1.8	1,741	3.2	1,326	2.5	24.3
Skin & Breast	1,563	2.6	1,275	2.3	1,211	2.3	-22.5
Infection	958	1.6	1,008	1.8	984	1.8	2.7
Injury & Poisoning	1,036	1.8	757	1.4	839	1.6	-19.0
Substance Abuse	633	1.1	699	1.3	638	1.2	0.8
Ear, Nose & Throat	1,822	3.1	765	1.4	636	1.2	-65.1
Lymphatic	1,241	2.1	668	1.2	616	1.2	-50.4
Spleen & Blood	465	0.8	443	0.8	526	1.0	13.1
Male Reproductive	812	1.4	435	0.8	447	0.8	-45.0
Multiple Trauma	30	0.1	127	0.2	115	0.2	283.3
Eye	403	0.7	103	0.2	76	0.1	-81.1
Burns	74	0.1	59	0.1	31	0.1	-58.1
HIV	9	0.0	29	0.1	30	0.1	233.3
TOTAL	59,151	100.0%	55,123	100.0%	53,507	100.0%	-9.5%
Vermont Population	562,758		608,827		615,611		9.4%

- **Total Vermont discharges are down -9.5% in spite of a 9.4% population increase.**

- **Multiple Significant Trauma showed the largest percent increase in discharges**, from 30 to 115, possibly due to a large increase in availability of emergency medical services.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Reason for Hospitalization: Top Five MDCs for Discharges

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

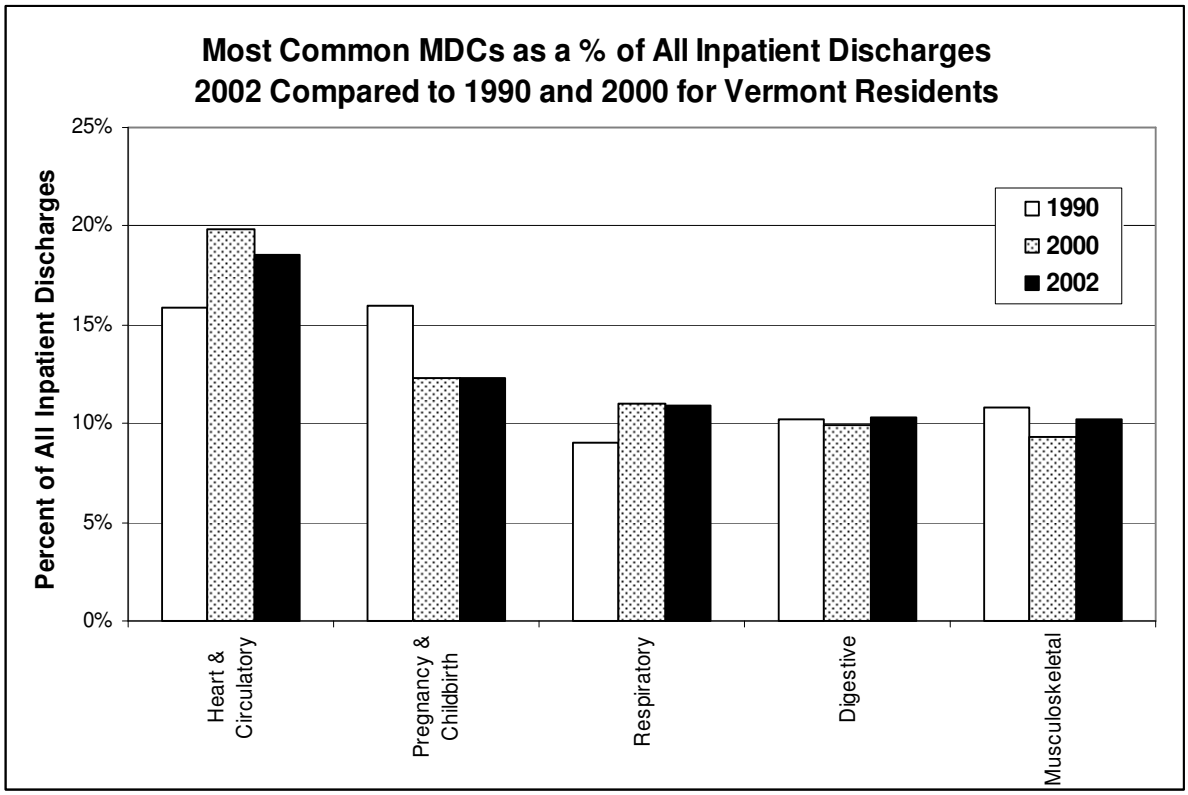


Figure 10

- **These five MDCs account for more than 60% of all hospitalizations.**
- **Among these five MDCs, the most dramatic changes since 1990 are the increases in Heart & Circulatory and Respiratory hospitalizations and the decrease in Pregnancy & Childbirth.**

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Reason for Hospitalization: Average Length of Stay (LOS) by MDC

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

Table 2

Vermont Inpatient Average Length of Stay (LOS) by MDC, Sorted by 2002 LOS				
	Average Length of Stay			
MDC	1990	2000	2002	Percent Change 1990-2002
Multiple Trauma	22.1	13.3	13.4	-39.6
All Other	10.3	8.4	9.6	-7.2
Mental Illness	13.2	7.3	7.7	-41.5
Burns	7.9	6.3	7.6	-4.2
Lymphatic	6.0	6.7	7.1	17.8
Infection	7.9	6.1	6.4	-19.2
HIV	7.9	5.8	6.4	-19.3
Brain & CNS	9.4	5.9	5.7	-39.3
Liver & Pancreas	7.4	5.2	5.6	-24.4
Respiratory	8.4	5.7	5.6	-33.8
Kidney & Urinary	5.7	4.8	5.3	-7.5
Digestive	6.5	5.2	5.1	-21.3
Spleen & Blood	6.5	4.4	4.9	-24.0
Musculoskeletal	6.7	5.1	4.9	-27.0
Substance Abuse	8.1	4.8	4.9	-40.3
Skin & Breast	7.2	4.7	4.8	-33.4
Heart & Circulatory	7.0	4.4	4.4	-36.7
Endocrine	7.5	4.9	4.4	-41.3
Injury & Poisoning	4.6	4.2	3.9	-14.0
Eye	2.6	2.7	3.8	44.1
Ear, Nose, & Throat	3.1	3.4	3.5	15.9
Male Reproductive	4.7	3.3	2.9	-39.0
Female Reproductive	4.4	2.8	2.8	-37.1
Pregnancy & Childbirth	2.7	2.4	2.5	-7.7
TOTAL	6.4	4.9	4.9	-24.0%

- **Vermont's hospital stays are shorter by -24.0%.**

- **Length of stay increased for only three MDCs: Lymphatic, Eye, and Ear, Nose and Throat.** For these three MDCs, the data show a shift of certain procedures to the outpatient setting, meaning that more complex situations remained in the inpatient setting.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Reason for Hospitalization: Top Five MDCs for Length of Stay

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

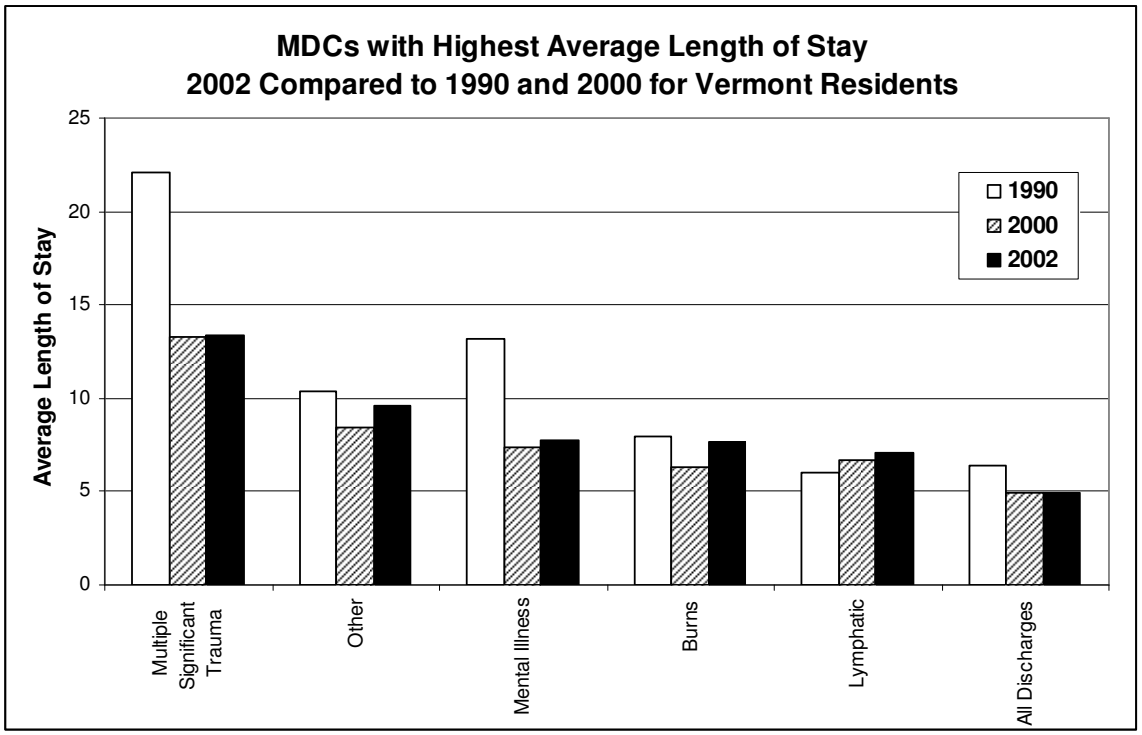


Figure 11

- **Length of stay dropped dramatically for Multiple Significant Trauma and for Mental Illness** at the same time that total discharges for these MDCs were increasing (by 283% and 42%, respectively).

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Part I: Inpatient Utilization

Reason for Hospitalization: Patient Days by MDC

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

Table 3

Vermont Inpatient Patient Days by MDC, Sorted by 2002 Volume							
	1990		2000		2002		
MDC	Patient Days	% of Total Patient Days	Patient Days	% of Total Patient Days	Patient Days	% of Total Patient Days	Percent Change 1990-2002
Heart & Circulatory	65,402	17.1	47,806	17.8	43,898	16.7	-32.9
Respiratory	44,780	11.7	34,413	12.8	32,338	12.3	-27.8
Digestive	39,393	10.3	28,188	10.5	28,301	10.8	-28.2
Musculoskeletal	42,809	11.2	26,010	9.7	26,709	10.2	-37.6
Mental Illness	28,749	7.5	20,958	7.8	23,889	9.1	-16.9
Brain & CNS	29,039	7.6	20,118	7.5	18,012	6.9	-38.0
Pregnancy & Childbirth	25,399	6.7	16,011	6.0	16,341	6.2	-35.7
All Other	11,039	2.9	14,655	5.5	12,737	4.9	15.4
Kidney & Urinary	11,213	2.9	8,385	3.1	8,904	3.4	-20.6
Liver & Pancreas	13,405	3.5	7,585	2.8	8,052	3.1	-39.9
Endocrine	10,640	2.8	7,500	2.8	7,133	2.7	-33.0
Infection	7,610	2.0	6,171	2.3	6,313	2.4	-17.0
Skin & Breast	11,204	2.9	5,962	2.2	5,779	2.2	-48.4
Female Reproductive	8,605	2.3	4,773	1.8	4,650	1.8	-46.0
Lymphatic	7,470	2.0	4,472	1.7	4,368	1.7	-41.5
Injury & Poisoning	4,716	1.2	3,169	1.2	3,285	1.3	-30.3
Substance Abuse	5,151	1.4	3,367	1.3	3,099	1.2	-39.8
Spleen & Blood	3,014	0.8	1,939	0.7	2,591	1.0	-14.0
Ear, Nose, & Throat	5,576	1.5	2,612	1.0	2,255	0.9	-59.6
Multiple Trauma	664	0.2	1,683	0.6	1,537	0.6	131.5
Male Reproductive	3,842	1.0	1,432	0.5	1,290	0.5	-66.4
Eye	1,060	0.3	281	0.1	288	0.1	-72.8
Burns	588	0.2	370	0.1	236	0.1	-59.9
HIV	71	0.0	167	0.1	191	0.1	169.0
TOTAL	381,439	100.0%	268,027	100.0%	262,196	100.0%	-31.3%
Vermont Population	562,758		608,827		615,611		9.4%

- **Vermont's total patient days are down by -31.3% in spite of a 9.4% population increase.** The decrease in patient days reflects the declines in both the total number of discharges and the length of stay.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Reason for Hospitalization: Top Five MDCs for Patient Days

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

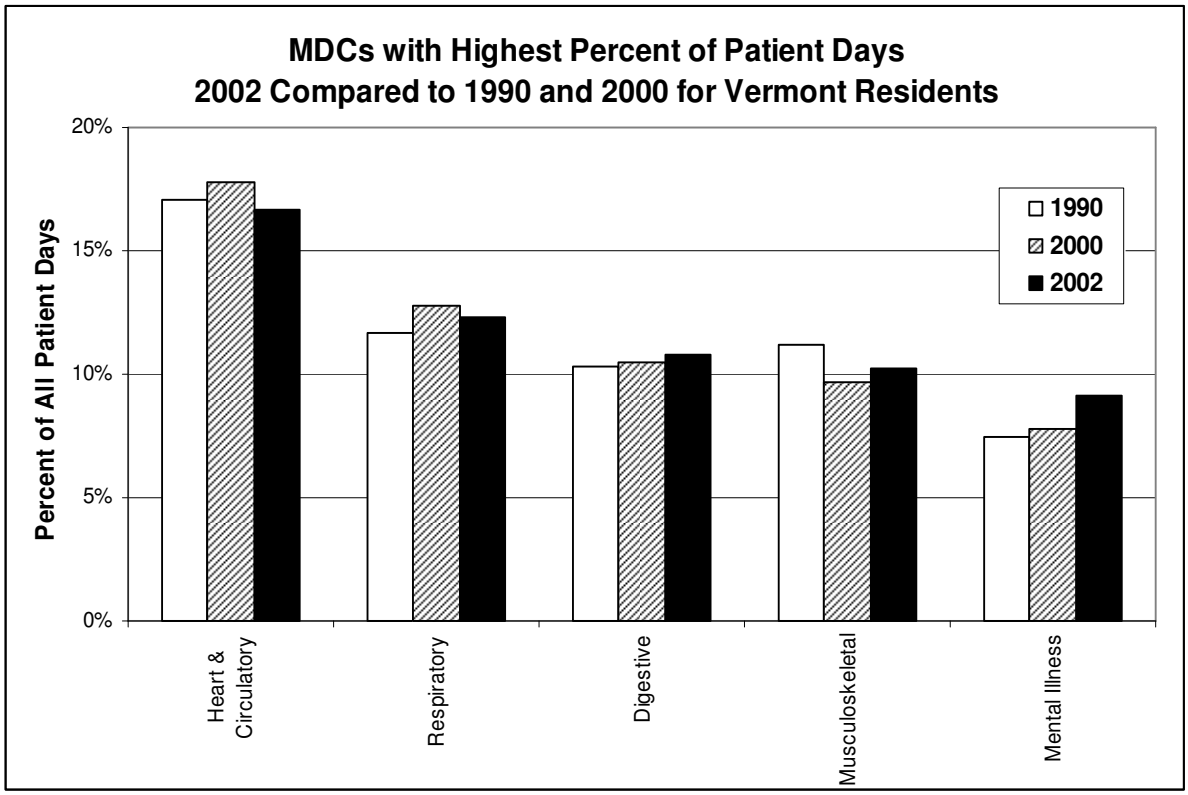


Figure 12

- **These five MDCs accounted for nearly 60% of all patient days.**

- **The most dramatic change was the increase in Mental Illness patient days.** This increase reflects two opposing trends: a 42% increase in discharges from 2,177 to 3,093 at the same time that average length of stay decreased from 13.2 to 7.7 days.

- **All five MDCs showed significant changes from 1990 - 2002, some increasing and some decreasing.**

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Reason for Hospitalization: Top Five MDCs in Terms of Surgery

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs). DRGs are defined as being surgical or medical. Only records with surgical DRGs were included in the data presented below.

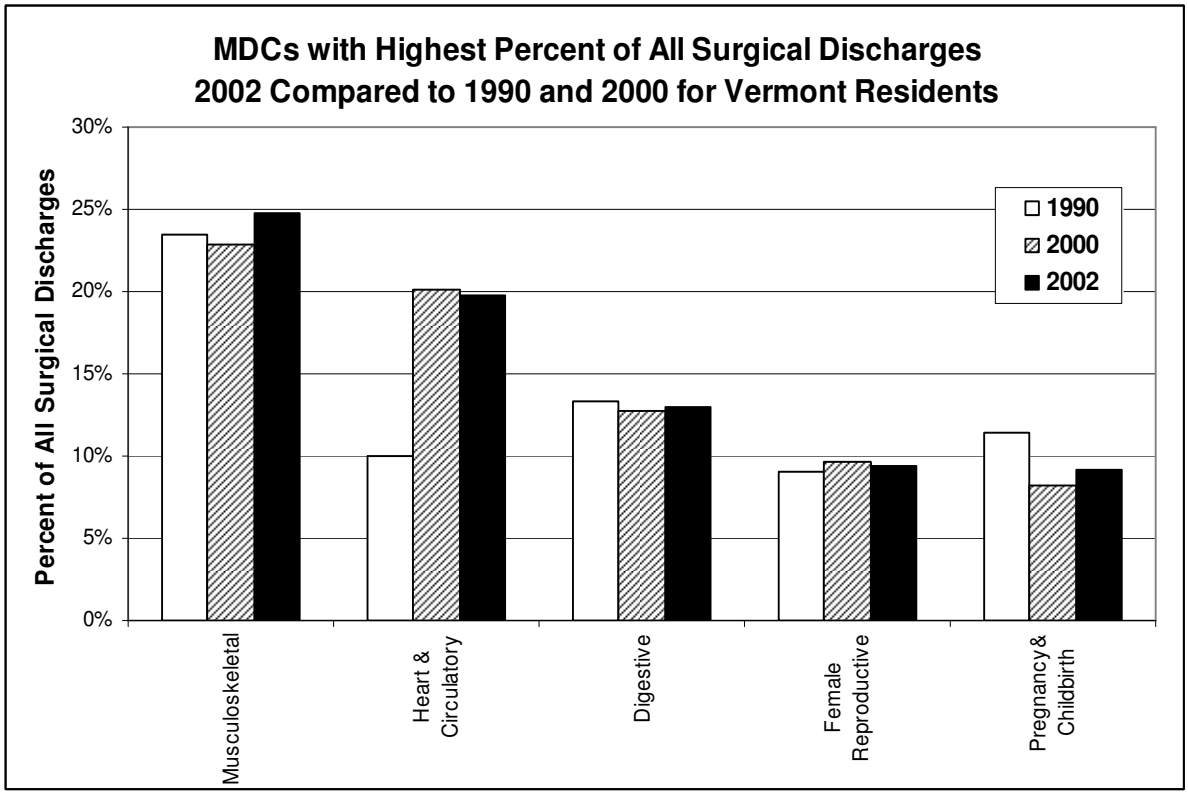


Figure 13

- **Overall, approximately 30% of hospitalizations had surgical DRGs.**
- **Heart & Circulatory surgeries increased dramatically from 1990-2002.** The decrease in Pregancy & Childbirth surgeries was also significant**.**

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Reason for Hospitalization by Age Group: Top Seven MDCs

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

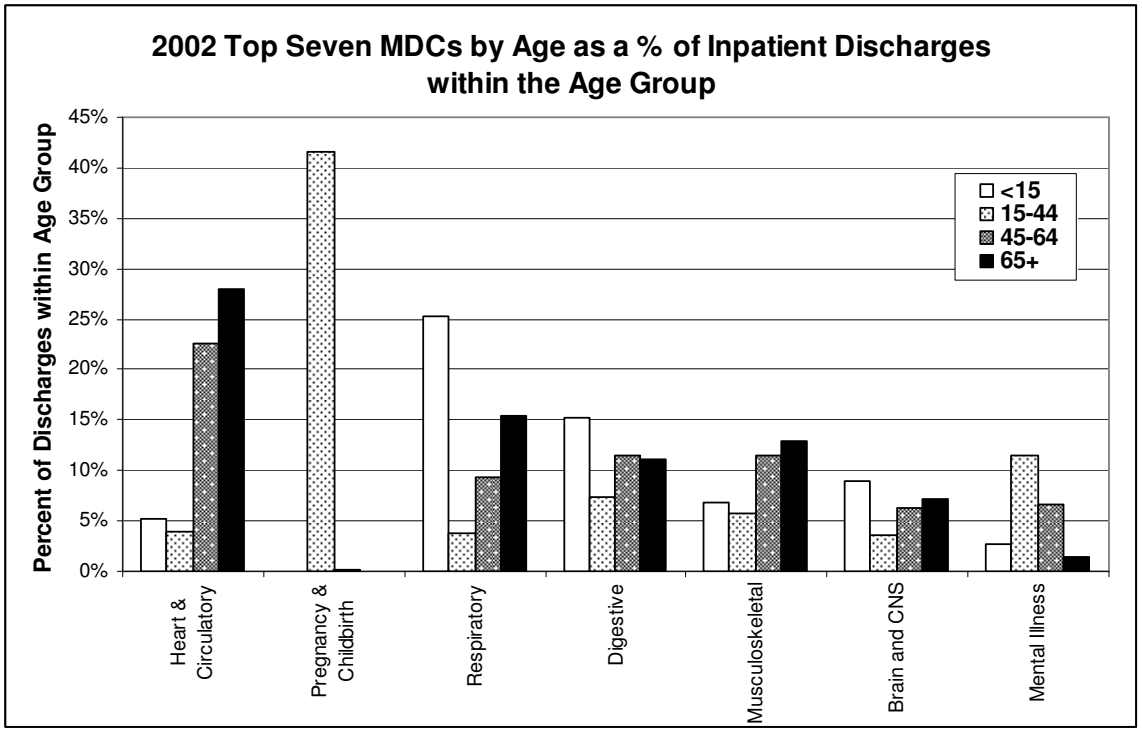


Figure 14

- **The five most frequent reasons for hospitalization within each age group are represented by the seven shown above, except for Lymphatic (fifth reason for children under 15) and Female Reproductive (fifth reason for ages 15-44).**

- **Hospitalizations for the seven reasons shown above varied across age groups in some predictable and some interesting ways. For example:**
  - Heart & Circulatory hospitalizations increased with age and were the primary reason for hospitalization within the two oldest age groups.
  - Pregnancy & Childbirth was the primary reason for hospitalization for ages 15-44 and rarely occurred outside that age group.
  - Respiratory hospitalizations were the primary reason for hospitalizations below age 15 (newborns excluded), dropped off dramatically for 15-44 year olds, and became increasingly more common again in older age groups.
  - Mental Illness hospitalizations were most frequent for ages 15-44 and 45-64.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Reason for Hospitalization by Age Group: Top Five MDCs for Age < 15

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

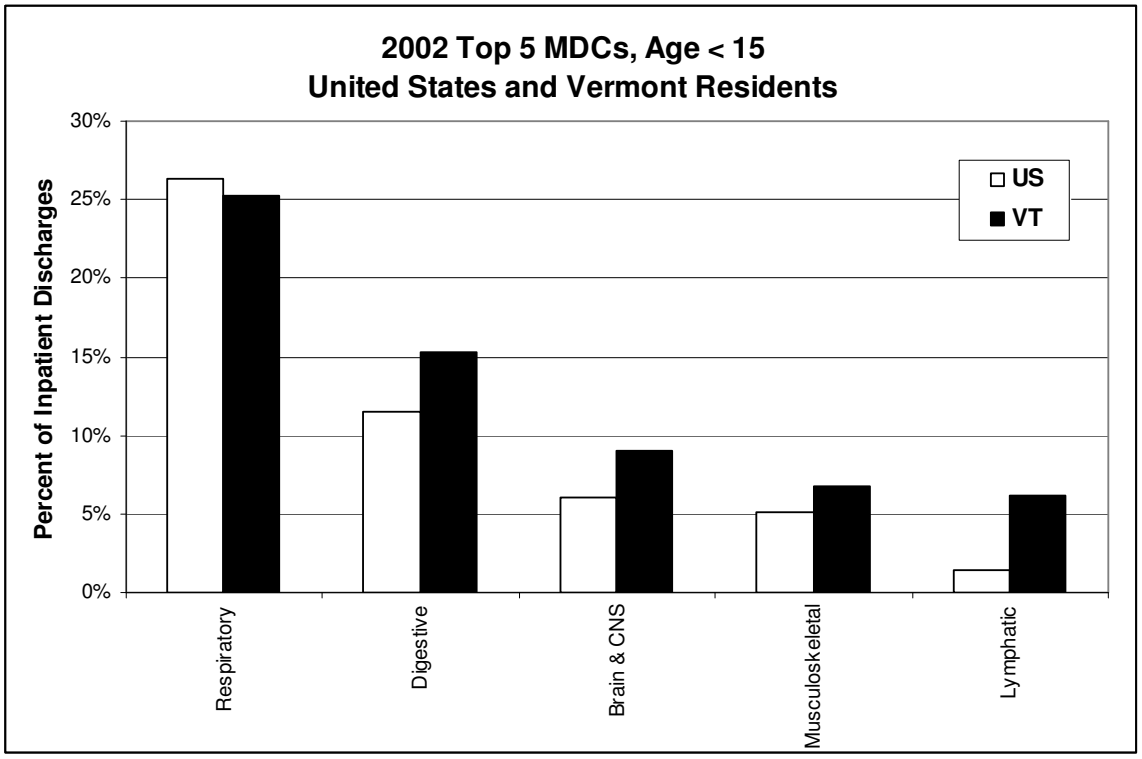


Figure 15

- **The leading reason for hospitalization of children under 15 (excluding newborns) in both the US and Vermont in 2002 was respiratory ailments (Figure 11).** Common respiratory diagnoses included bronchitis, pneumonia, and asthma.

- **The next most common reason for hospitalization was digestive disorders, such as appendectomy and gastroenteritis.**

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Reason for Hospitalization by Age Group: Top Five MDCs for Ages 15-44

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

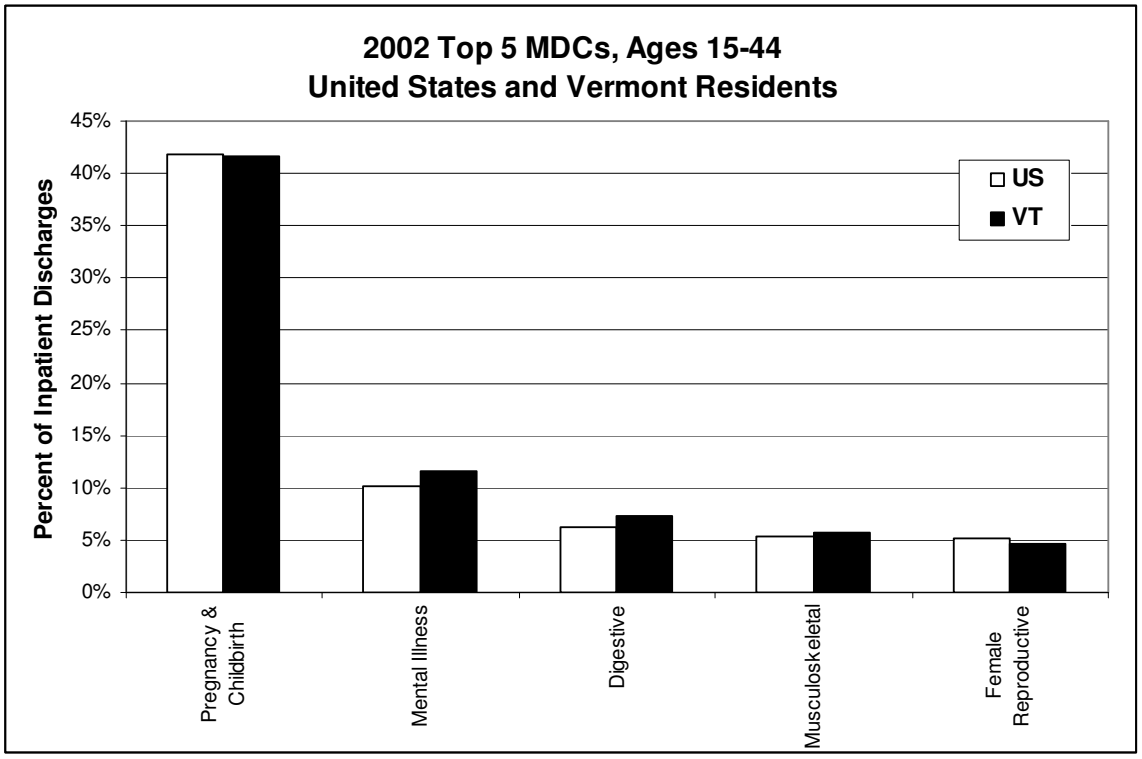


Figure 16

- **Pregnancy & Childbirth was by far the most frequent reason for hospitalization in the 15-44 age group.** More than 40% of all hospitalizations for this age group were for maternity-related diagnoses.

- **Considering only non-maternity hospitalizations, Mental Illness was the most common reason for hospitalization in this age group.** Mental Illness hospitalizations accounted for about 20% of the non-maternity hospitalizations, significantly more than any other MDC.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Reason for Hospitalization by Age Group: Top Five MDCs for Ages 45-64

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

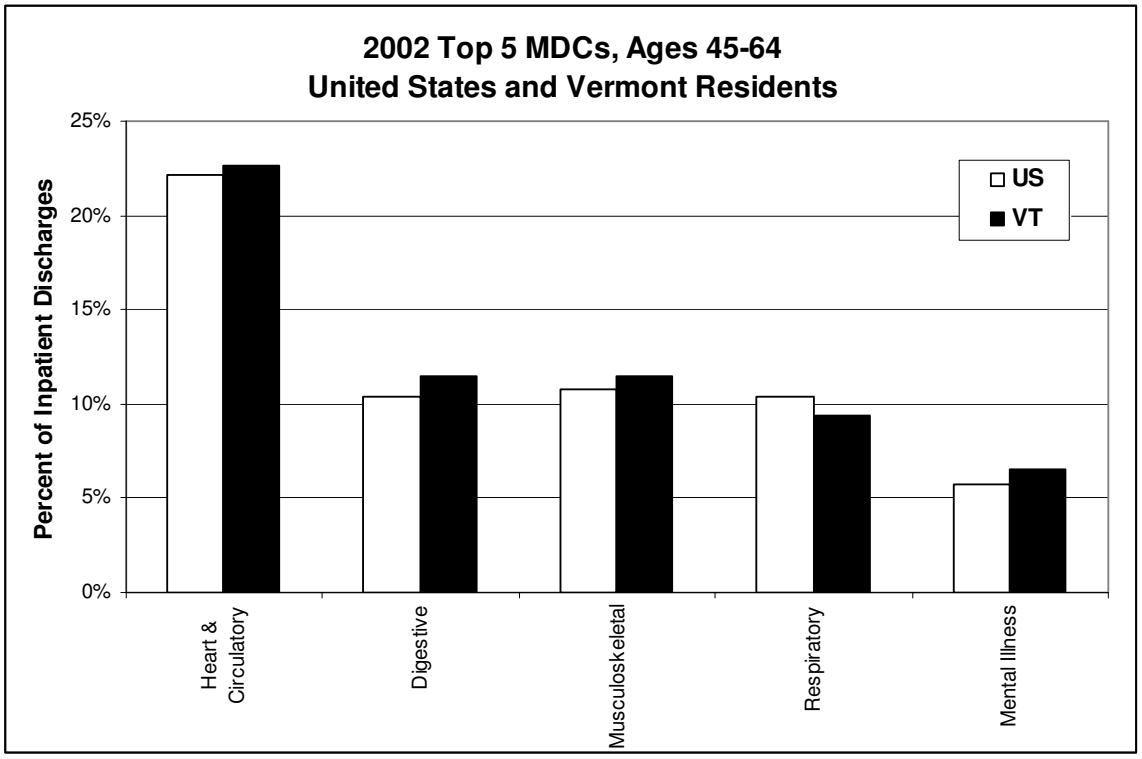


Figure 17

- **For ages 45-64, Heart & Circulatory was the top reason for hospitalization.** This is a dramatic shift from the pattern in the 15-44 age group where Heart & Circulatory is not one of the top five reasons.

- **Three of the top five reasons for the 45-64 age group, Digestive, Musculoskeletal, and Mental Illness, were also in the top five for the 15-44 age group.**

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Reason for Hospitalization by Age Group: Top Five MDCs for Ages 65+

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

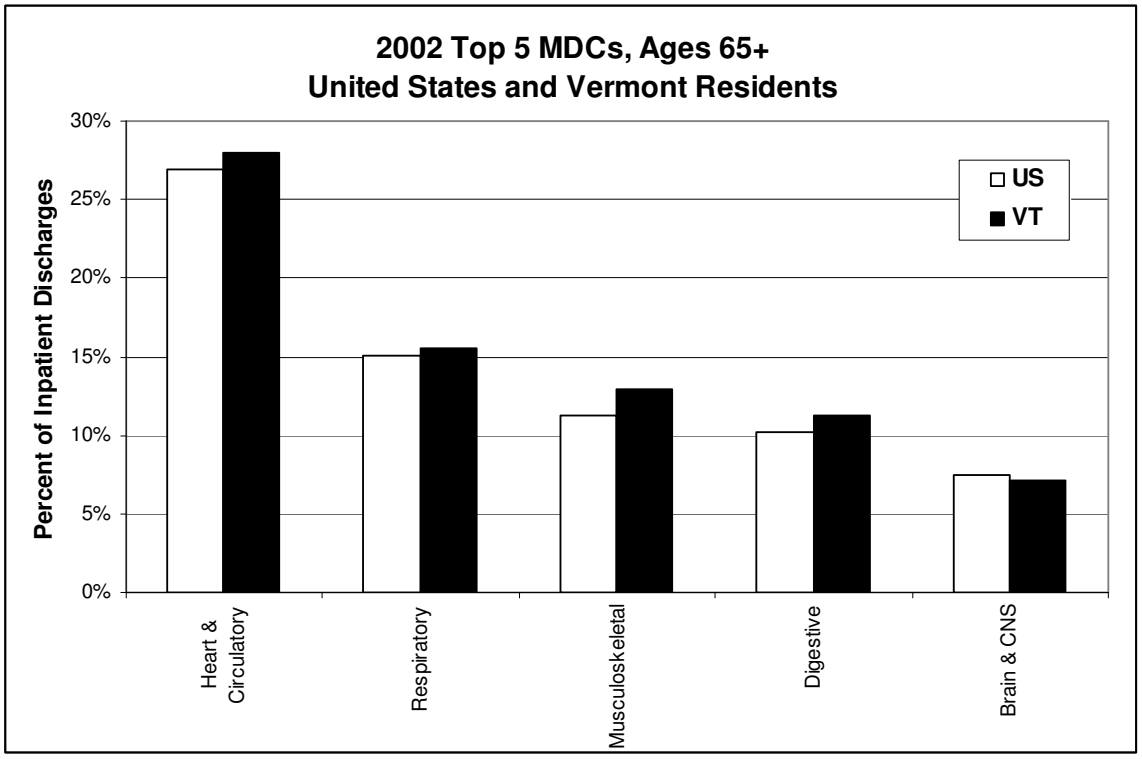


Figure 18

- **For this oldest age group, Heart & Circulatory problems were the leading reason for hospitalization, as was the case for the 45-64 age group.** Over one quarter of all discharges in the 65+ age group was for diagnoses related to the heart and circulatory system.

- **Patients aged 45-64 and 65+ share the same top four reasons for hospitalization which are all highly related to chronic disease and the aging process:** Heart & Circulatory, Respiratory, Musculoskeletal, and Digestive disorders**.**

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Primary Payer: United States and Vermont

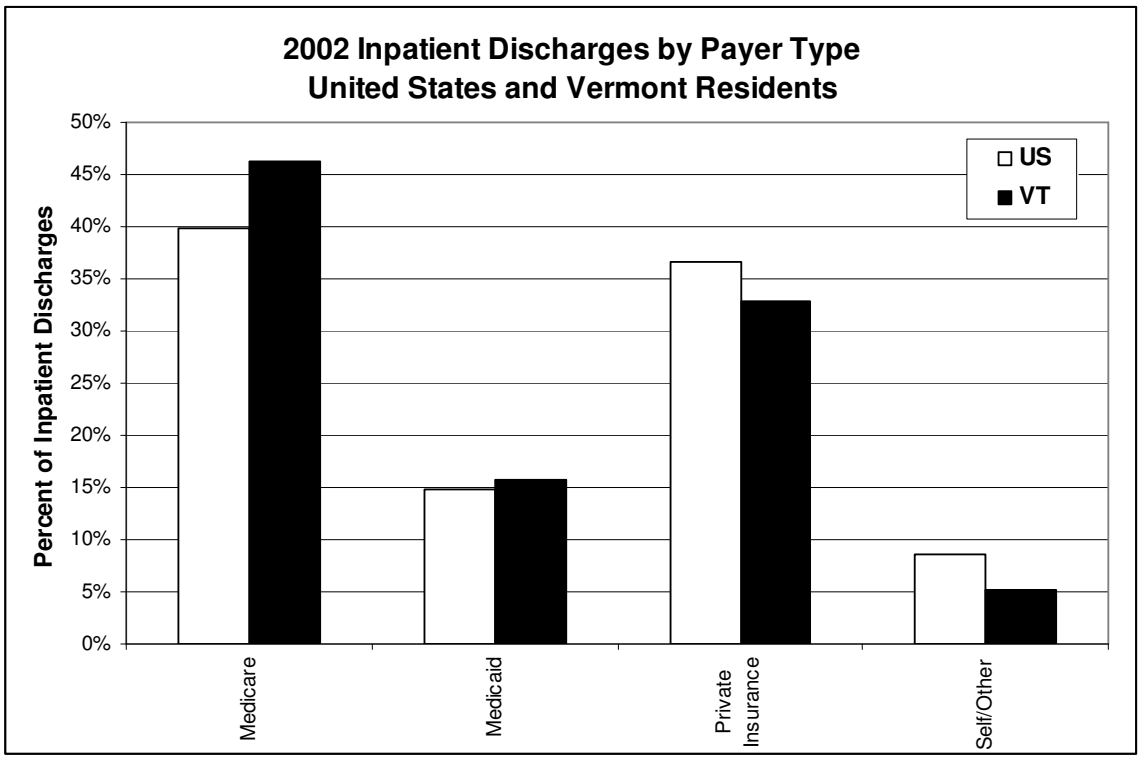


Figure 19

- **Vermont was significantly higher than the overall US in the percent of Medicare and Medicaid discharges.** Vermont's higher percent of Medicare discharges is consistent with the population data for Vermont compared to the overall US. The percent of Vermont's population that is age 65 and above is significantly larger than the overall US percent for age 65 and above.

- **Vermont was significantly lower than the overall US in private insurance and self-pay / other discharges.** Again, this is consistent with the smaller percent of Vermonters in younger age groups.

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Primary Payer: Vermont Trends

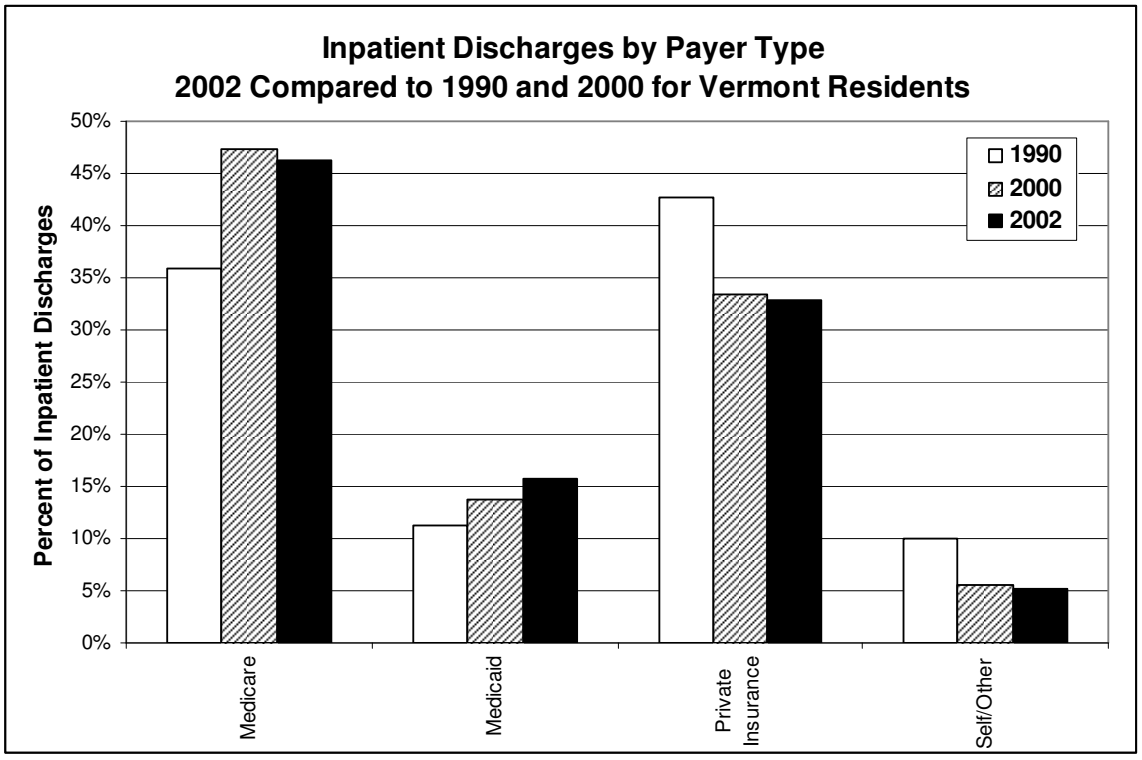


Figure 20

- **Vermont's percentage of Medicare and Medicaid discharges increased significantly from 1990-2002.** The Medicare increase is consistent with the aging of Vermont's population.

- **The percentage of private insurance and self-pay / other discharges decreased significantly during the same time period.**

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Part I: Inpatient Utilization

Primary Payer by MDC: Discharges and Charges as a Percent of Total

MDCs (Major Diagnostic Categories) are 25 categories of related diagnoses which collapse 540 more detailed groupings called Diagnosis Related Groups (DRGs).

Table 4

2002 Vermont Inpatient Discharges and Charges by MDC and Payer, Sorted by Volume

	Medicare		Medicaid		Private Ins.		Self/ Other	
	% Total		% Total		% Total		% Total	
MDC	Disch.	Charges	Disch.	Charges	Disch.	Charges	Disch.	Charges
Heart & Circulatory	26.7	29.6	6.6	9.5	14.1	21.6	13.0	19.3
Pregnancy & Childbirth	0.2	0.1	30.4	15.7	23.1	8.7	4.5	2.2
Respiratory	15.4	13.4	8.9	11.4	6.1	7.2	6.3	7.6
Digestive	10.7	11.1	7.8	8.3	11.3	11.3	7.9	7.1
Musculoskeletal	12.3	15.9	4.9	8.5	9.2	13.5	15.4	19.2
Brain and C.N.S.	6.9	6.3	4.5	8.3	4.9	7.0	5.6	8.9
Mental Illness	3.7	2.5	11.9	8.2	4.4	2.4	9.8	5.1
Kidney & Urinary	4.1	3.9	2.1	1.9	2.4	2.8	2.1	3.6
Female Reproductive	1.3	1.1	3.4	3.4	6.0	4.7	1.8	1.5
Endocrine	3.3	2.1	3.5	2.7	2.4	1.9	2.0	1.5
Liver & Pancreas	2.4	2.7	2.9	6.2	2.9	3.2	3.3	3.2
All Other	3.0	2.5	0.9	1.8	1.3	1.9	10.9	3.1
Skin And Breast	2.4	1.7	2.0	1.7	2.1	1.5	3.1	2.8
Infection	2.1	2.5	1.7	2.0	1.7	2.0	1.3	1.6
Injury & Poisoning	1.2	1.0	2.1	1.6	1.4	1.1	3.4	3.1
Substance Abuse	0.5	0.3	2.8	1.3	0.6	0.3	4.4	1.5
Ear, Nose & Throat	0.8	0.8	1.2	1.3	1.7	1.5	1.3	1.3
Lymphatic	0.7	0.9	1.0	2.7	1.8	3.7	0.8	2.2
Spleen & Blood	1.0	0.9	0.6	0.6	1.1	1.4	0.9	0.9
Male Reproductive	0.9	0.6	0.3	0.3	0.9	0.9	0.2	0.2
Multiple Trauma	0.0	0.1	0.2	1.9	0.4	1.3	1.0	3.4
Eye	0.1	0.1	0.1	0.3	0.1	0.1	0.4	0.3
Burns	0.0	0.1	0.1	0.0	0.1	0.1	0.3	0.3
H.I.V.	0.0	0.0	0.2	0.4	0.0	0.0	0.1	0.1
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

- **Not surprisingly, Medicare payments were highest for those MDCs which were the leading causes of hospitalization for Vermonters age 65+ (Figure 15).**

- **Among Medicaid patients, the most common reasons for hospitalization were Pregnancy & Childbirth and Mental Illness.**

Data source: VT Uniform Hospital Discharge Data Set
Data for newborns are excluded.

Part II: Hospital Service Areas

Why Create Hospital Service Areas (HSAs)?

While a great deal can be learned about the activities of a hospital by studying its individual statistics, this information by itself can not provide a full picture of the care provided. For example, if one hospital perfoms twice as many of a specific procedure than another, it does not necessarily indicate that the first hospital is performing the procedure too often or the second, too rarely.

To more fully understand the provision of health care by hospitals, it is necessary to establish a population served by each hospital. These populations can then be used to calculate rates. Rates allow for more meaningful comparisons among hospitals by eliminating the effect of the size of the populations which they serve.

A Hospital Service Area (HSA) is a geographically distinct population (a group of towns) with a high level of dependence on a specific hospital or group of hospitals. The concept of a Hospital Service Area is useful to a hospital because it identifies the principal consumers of the hospital's services. The size and shape of the hospital's service area shows the hospital's market penetration and the competitive environment in which it operates.

It is important to keep in mind two caveats about interpreting data based on hospital service areas (HSAs). First, from the perspective of people needing hospital services, the residents of an HSA, by definition, obtain a significant amount of their care from the hospital(s) in their HSA. But they may also receive a substantial quantity of care from other hospitals.

Second, regarding hospital services, much of the care that a hospital provides is to residents of its service area. However, a hospital may also provide care to Vermonters who live outside its HSA as well as to non-Vermonters. This is particularly true if the hospital is a referral center or is located near a border.

Analysis of hospital data by HSA can be especially helpful in detecting variations in utilization patterns of people living in different areas of the state. Residents of one HSA might have more frequent hospitalizations or longer lengths of stay than residents of another HSA, for example.

Understanding the cause of different HSA utilization patterns, however, can be challenging because of the many factors involved. Residents of one area may have less access to primary care than those of another, or physicians in one area may hospitalize patients who physicians in another area would treat on an outpatient basis. Or, the health status of residents may vary across regions of the state. Analysis of the hospital discharge data can show where variations exist, but a comprehensive look at the entire health care system of Vermonters is needed to understand disparate patterns.

Hospital Discharge Data for Towns and ZIP Codes

Hospital service area definitions are based on the geographic information in the hospital discharge file. There are two geographic data elements in the discharge files:

- ZIP code (from the billing address) and
- town of residence (a code separate from the billing address).

While these two geographic fields are related, they are not identical. Some towns have no ZIP code of their own. For example, Georgia, VT, does not have its own post office. Residents of Georgia have one of three ZIP codes: 05454 – Fairfax; 05468 – Milton; or 05478 – St. Albans. Similarly, the St. Albans ZIP code of 05478 is used by residents of Fairfax, Fairfield, Georgia, Sheldon, St. Albans Town, St. Albans City, and Swanton. Only 14 of Vermont's 251 towns have a one-to-one correspondence between their ZIP code and their town.

The quality of the data for these two geographic data elements in the hospital discharge dataset was studied in 1996-97 and was reported on in the *1994 Vermont Hospital Monograph Companion*. From this study, it was determined that ZIP code information in the hospital discharge dataset was more accurate than town information. Based on this finding, a complex set of rules was developed for assigning each hospital discharge record to a hospital service area. In general, when there is disagreement between the ZIP code and the town code, the ZIP code is considered more reliable.

Populations for Towns and ZIP Code Areas

In order to produce hospitalization rates, two numbers are needed: the number of hospitalizations (the numerator) and the population (the denominator). In Vermont, town population estimates are updated annually, based on the decennial census, previous estimates, vital records such as births, and other factors. These annual estimates allow researchers to perform town-based geographical analysis on the hospital discharge data.

Unfortunately, ZIP code population estimates are not as readily available as town-level estimates. ZIP code populations are further complicated by the fact that the Post Office adds and removes ZIP codes as needed to deliver the mail efficiently, and thus ZIP code boundaries are not stable over time. Because of these problems, use of town populations is preferable to ZIP code figures.

ZipTowns – A Hybrid Approach

Hospitalization rates are calculated by dividing the number of hospitalizations by the population. However, the ZIP code information in the hospital discharge dataset is more reliable than the town information, while the town population data is more available and stable than the ZIP code population data.

Traditionally, the solution to this dilemma is to create "ZipTowns." ZipTowns are formed by combining towns with overlapping ZIP codes to create geographic regions in which the ZIP codes and town boundaries correspond. For example, residents of Sandgate and Sunderland use the Arlington ZIP code of 05250 or, in some instances, the East Arlington ZIP code of 05252. Both Arlington and East Arlington are part of Arlington town. By combining Sandgate, Sunderland, and Arlington into a ZipTown, the number of hospitalizations and the population base should correspond to the same geographic region.

The goal of ZipTown assignments has been to have as little "spill" between them as possible and to ensure a minimum population base of 1,000 residents. ZipTown boundaries were last fully examined in 1996-97, but ZIP code and town information have been updated annually as needed.

Hospital Service Area Definition Over Time

Due to changes in technology, financing and reimbursement, population characteristics, and the economy, the health care system serving Vermonters constantly changes. The hospital service area (HSA) definitions used in the Monographs have been modified three times to reflect changing discharge patterns.

The first three versions of HSAs definitions used data for all inpatient discharges (except newborns) over a five year period to assign ZipTowns to HSAs. In the first three HSA versions, strict rules for inclusion of ZipTowns in any HSA resulted in Vermont towns that could not be assigned and were therefore considered "contested." The fourth version of HSAs (described below) uses a subset of inpatient records and assigns ZipTowns so that none are considered contested.

The Fourth Version of Hospital Service Areas

Starting with the 2002 Monograph, HSAs are based on inpatient discharges, where the diagnosis indicated the need for immediate care, for the years 1997-2001. Prior versions of HSAs have been based on all inpatient stays (except for newborns) and have used a strict decision rule for inclusion of ZipTowns in a hospital's service area. Use of a strict inclusion rule meant that there were always towns that were not assigned to any HSA and were labeled "contested."

In preparing for this fourth version of HSAs, rules used to define the 3rd version of HSAs were applied to 1997-2001 data. The number of contested towns rose from 54 to 77, nearly a third of all Vermont towns. This resulted in the loss of one hospital service area and a serious erosion of others. As a result of this increase in contested towns, two major changes were made to the process of defining HSAs. In addition to these definitional changes, HSA names were changed. To distinguish these new HSAs from previous ones, HSAs were given the name of the most populous town in their area.

The first major change was that selection of records was limited to those discharges with diagnoses considered to require immediate hospitalization as described by Newton and Goldacre in their 1994 article, "How many patients are admitted in districts other than their own, and why?" (Journal of Public Health Medicine, 1994, Vol. 16, No. 2, pp. 159-164). Newton and Goldacre used records of patients with acute conditions which require immediate hospitalization, because patients with these conditions tend to go to the hospital nearest to them when they become ill. The authors excluded newborns and patients transferred from another hospital. The authors included records with the following acute conditions as their primary diagnoses:

appendicitis (ICD-9-CM codes 530-543),
abcess of anal and rectal regions (ICD-9-CM codes 566),
peritonitis (ICD-9-CM codes 567),
acute myocardial infarction (ICD-9-CM codes 410),
pneumococcal pneumonia (ICD-9-CM codes 481), and
asthma (ICD-9-CM codes 493).

The second major change was the shift to a plurality rule in assigning ZipTowns to HSAs, so that all towns are assigned to an HSA with none remaining contested. As described above, ZipTowns are towns or groups of towns with over 1,000 residents and relatively contained ZIP code boundaries (see Appendix E for a list of ZipTowns in each HSA). ZipTowns were assigned to hospital service areas as follows:

1) If the plurality of a ZipTown's discharges were from a Vermont hospital or Dartmouth Hitchcock Medical Center (DHMC) in Lebanon, New Hampshire, the ZipTown was assigned to that hospital's service area.
2) If the plurality of a ZipTown's discharges were from a non-Vermont hospital other than DHMC, the ZipTown was assigned to the HSA of the Vermont hospital (or DHMC) with the next highest number of discharges.

One ZipTown called Guildhall, made up of five towns in Essex County which were previously designated as contested, had only four discharges to a nearby Vermont hospital. All four discharges were Lunenburg residents discharged from Northeastern Vermont Regional Hospital in St. Johnsbury. Using the plurality rule, Lunenberg was added to the Burke area ZipTown which is assigned to the St. Johnsbury HSA. The remaining four towns in the Guildhall ZipTown had no discharges to a nearby Vermont hospital. These four towns were assigned to HSAs based on a decision to follow the boundaries used for the Agency of Human Services District Offices. Using this approach, Guildhall and Maidstone were assigned to the Burke area ZipTown in the St. Johnsbury HSA. The remaining towns of Bloomfield and Brunswick were assigned to the Canaan area ZipTown in the Newport HSA.

The HSAs continue to include two multi-hospital areas: the White River Junction HSA (Dartmouth Hitchcock Medical Center, Mt. Ascutney Hospital, and the Veterans Administration Hospital) and the Brattleboro HSA (Brattleboro Memorial Hospital and Grace Cottage Hospital). These HSAs include multiple hospitals because resident hospitalizations are split among the hospitals with no clear majority of inpatient discharges concentrated at any one hospital.

Hospital Service Area Maps

Hospital service area maps are presented on pages 34 and 35. Map 1 presents the 3rd version of hospital service areas (HSA3) that was in use for hospital data reporting years 1995-2001. HSA3 was based on data from reporting years 1990-94. Thirteen HSAs were defined, with 54 towns designated as contested.

Map 2 shows the effect on HSAs and contested towns when the definition used for HSA3 was applied to 1997-2001 data. One hospital's service area disappeared entirely, many other HSAs were reduced in size, and the total number of contested towns increased from 54 to 77.

Map 3 presents the fourth version of HSAs, using only hospital discharges with the selected acute primary diagnoses requiring immediate hospitalization described above and using a plurality rule so that there are no contested towns. Most hospital service areas grew in number of towns.

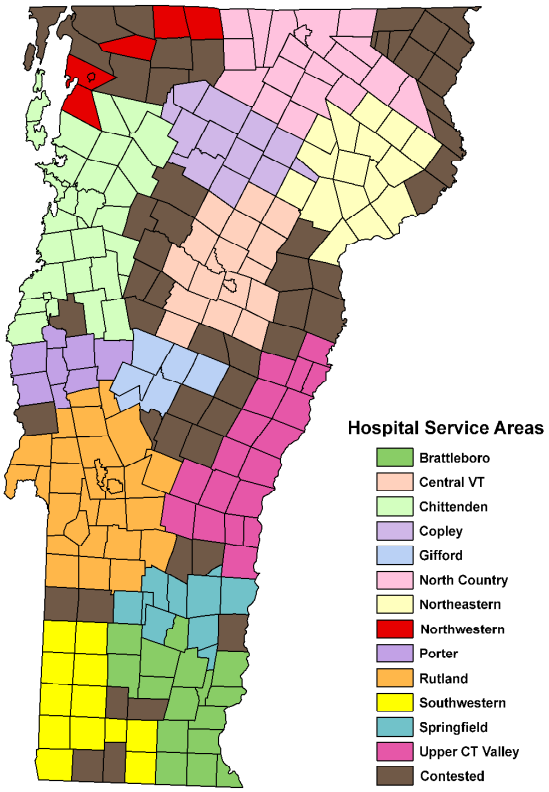
Map 1 shows Vermont's hospital service areas (Version 3) based on 1990-1994 data.

This version used an all-inclusive definition for selecting data. All 1990-1994 data (excluding newborns) were selected.

A strict "55/45" rule was used for assigning towns, resulting in 54 "contested" towns (21% of all Vermont towns) that could not be assigned to a HSA.

These HSAs were in use for reporting years 1995-2001.

Map 1: HSAs (Version 3)



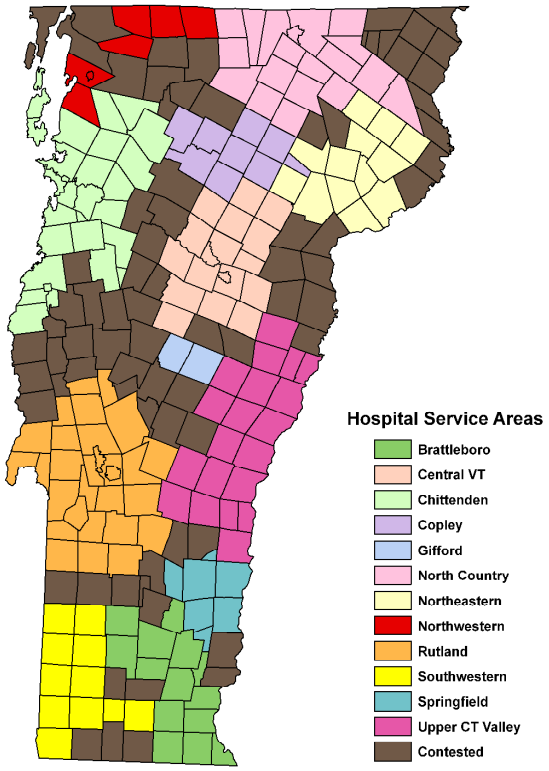
Map 2 shows Vermont's hospital service areas, using Version 3 definition, updated with 1997-2001 data.

The same definition as above was used for selecting data. All 1997-2001 data (excluding newborns) were selected.

The same strict "55/45" rule was used for assigning towns, resulting in 77 "contested" towns (30% of all Vermont towns) that could not be assigned to a HSA.

Porter's HSA disappeared entirely and many other HSAs lost towns.

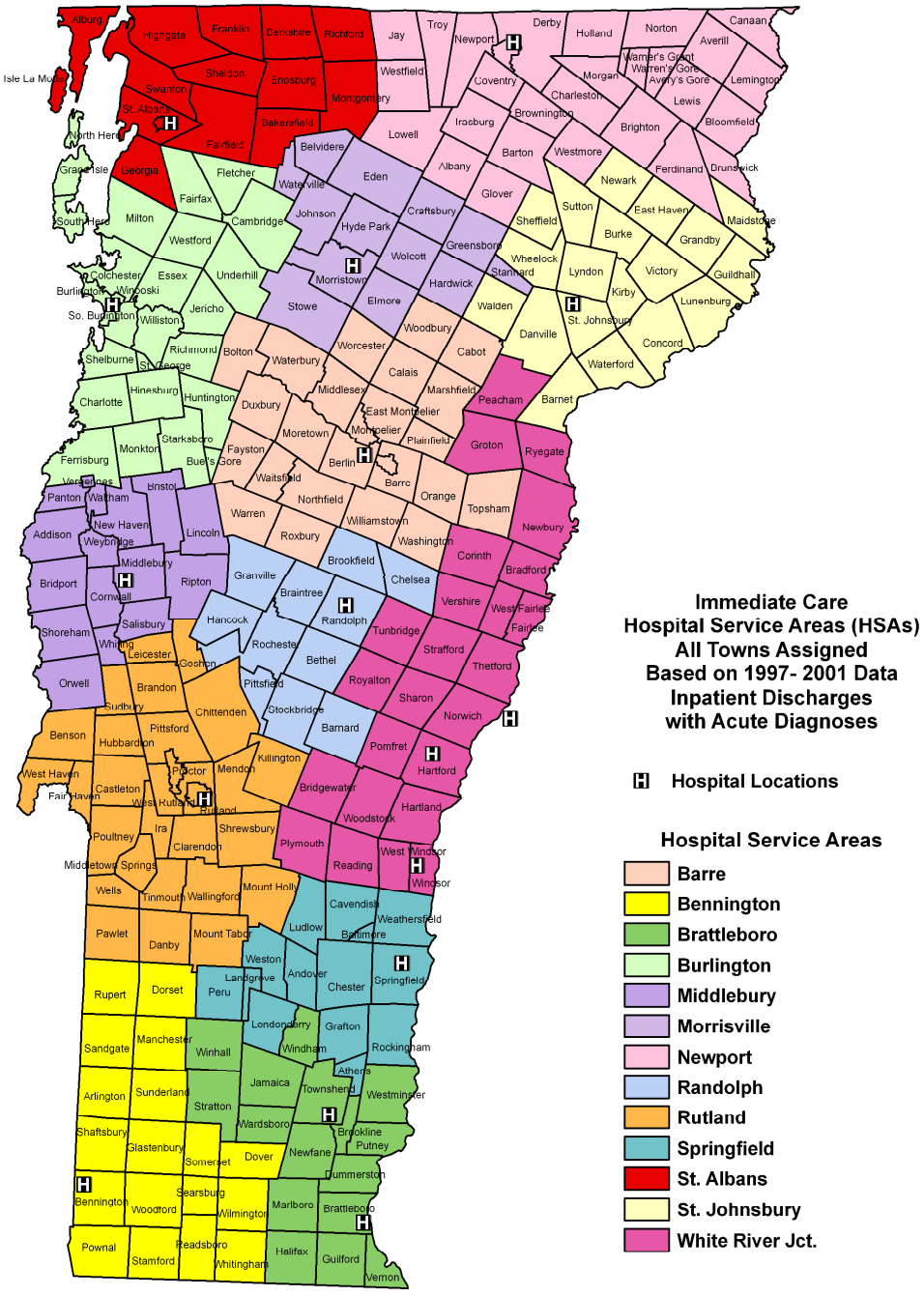
Map 2: What would happen to HSAs using Version 3 definition updated with 1997-2001 data



Map 3 shows Version 4 of Vermont's hospital service areas based on 1997-2001 immediate care records with acute diagnoses

All towns assigned. Most HSAs grew because of the assignment of formerly "contested" towns.

Map 3: HSAs (Version 4)



Appendix A: Glossary of Terms

Age Adjustment – Takes into account underlying differences in age distributions between two or more populations or one population at two or more points in time. Age-adjusted rates are computed by applying age-specific rates in a population of interest to a standardized age distribution, in order to eliminate differences in observed rates that result from age differences in population composition. Age adjustment is used in this report for some comparisons between Vermont and the United States.

Average Length of Stay - Total patient days divided by the number of discharges in a selected category. It is a measure of the amount of care provided during a typical hospital stay.

Charges – The amount that the hospital billed for its services, not the amount of payment that the hospital received. Payments are frequently less than charges as a result of contractual arrangements with payers.

Discharge – An individual inpatient hospitalization. Discharge dates, rather than admission dates, are used to indicate when a case is reported. A count of discharges measures how often care is sought. The same individual will be counted as more than one discharge if hospitalized more than once during the time studied. In order to avoid counting hospitalizations for delivery twice, maternal records are included in the dataset and newborn records (defined as MDC = 15 for Vermont) are excluded. This is standard practice in hospital utilization analysis.

Diagnostic Related Groups – Classification of discharges into approximately 540 categories based on age, sex, diagnoses, procedures, and outcome. Each category consists of conditions which are medically similar and require similar levels of care. DRGs are identified as either medical or surgical. Under a prospective payment system, Medicare pays hospitals a set fee for treating a patient based on DRG category, regardless of the actual cost of care for the individual.

Inpatient Dataset – Consists of discharge records that were billed as inpatient stays. Newborn records (defined as MDC = 15 for Vermont) are excluded from analyses in this report while maternal records are included to avoid duplicate counts in the tables/graphs. (Both newborn and maternal records are retained in the Vermont dataset.)

Major Diagnostic Category (MDC) – The aggregation of Diagnostic Related Groups (DRGs) into 25 groups which define major body systems.

National Hospital Discharge Survey (NHDS) – An annual survey conducted by the National Center for Health Statistics that includes data on the characteristics of patients discharges from non-Federal short stay hospitals. The NHDS includes inpatient records from a national probability sample of hospitals. For more information, visit www.cdc.gov/nchs/about/hdasd/listpubs.htm.

Patient Day – A stay in a hospital for all or part of a day. Patient days are one way of measuring the amount of care provided.

Population – Population data are derived from the 1990 and 2000 U.S. Censuses, from U.S. population Census estimates for July 1 of each intercensal year, from estimates of Vermont's population produced by the Center for Rural Studies at the University of Vermont for the 1991-1999 intercensal years,

and from 2001-2002 estimates of Vermont's population prepared for VDH by Claritas, Inc. Population estimates published in the 1990-1999 *Monograph* series may vary slightly from population data published in this report due to revised estimates that resulted from the 2000 Census.

Principal Payer – The anticipated principal source of payment of the patient's hospital bill.

Rate – Count divided by the population. In order to remove the effect of different population sizes, rates are used instead of counts. The numerator is the number of events in question and the denominator is the number of people at risk for being in the numerator. To make rates easier to understand, they are usually expressed as the number of events per some large number of people, typically 1,000, 10,000 or 100,000 people.

Statistical Significance – Because some of the fluctuation in hospitalization rates is due to chance, trends and comparisons in this report were tested for statistical significance. A 95 percent confidence interval was calculated for each rate, so that the interval has a 95 percent chance of containing the "true" rate, or a rate unaffected by chance events. When confidence intervals for two rates overlap, the difference between the two rates is said to be not statistically significant. Confidence intervals for Vermont rates were calculated with a simple symmetric method. Confidence intervals for the national dataset, the National Hospital Discharge Survey (NHDS), were calculated from published parameters generated by the National Center for Health Statistics using first-order Taylor series approximation of the deviation of estimates from their expected values. Confidence intervals for NHDS rates take into account the sampling variability that occurs because a sample, not the entire universe, is surveyed.

Appendix B: Vermont Hospital Discharge Data Elements

Attribute	Description	Public Use Data Element	Inpatient Dataset
Admission Date		N	Y
Admission Hour		N	Y
Admission Source	Transfer, referral, newborn and court/law enforcement categories	Y	Y
Admission Type	Emergency, urgent, elective, newborns	Y	Y
Age	Single-year age at discharge	N	Y
Age Groups	Under 1, 1-17, 18-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75 and over	Y	Y
Attending physician	Hospital-specific code for attending physician at time of discharge	N	Y
Clinical Classifications Software (CCS) Single Level Diagnosis Groups	Principal diagnosis collapsed into 262 categories. See description in Appendix A.	Y 2001-	Y
Clinical Classifications Software (CCS) High Level Diagnosis Groups	CCS single level diagnosis groups collapsed into 18 high level categories. See description in Appendix A.	Y 2001-	Y
Clinical Classifications Software (CCS) Single Level Procedure Groups	Principal procedure collapsed into 231 categories. See description in Appendix A.	Y 2001-	Y
Clinical Classifications Software (CCS) High Level Procedure Groups	CCS single level procedure groups collapsed into 16 high level categories. See description in Appendix A.	Y 2001-	Y
Date of Birth		N	Y
Diagnosis Related Group (DRG)	Medicare classification system that groups inpatient discharges into approximately 540 categories based on diagnosis, type of treatment, age and other relevant criteria. See listing in Appendix C.	Y	Y
Discharge Date		N	Y
Discharge Status	Categories indicating destination and type of services required at time of discharge, left against medical advice, or death	Y	Y
Ecode	Code for external causes of injury and poisoning; primary Ecode appears in this field, secondary Ecodes may be entered as secondary diagnoses	Y	Y
Grouper	Grouper version used to assign DRG and MDC	Y	Y
Hospital		Y	Y

Hospital Service Area	A grouping of Vermont ZipTowns based on each ZipTown's use of hospital resources. See description on pages 30-32.	Y	Y
Major Diagnostic Category (MDC)	An aggregation of DRGs (see definition of DRGs above) into 25 groups that define major body systems.	Y	Y
Other Physician 1 Other Physician 2	Hospital-specific code for physician performing primary procedure (Other Physician 1) and for physician other than Attending Physician and Other Physician 1	N	Y
Patient days	Length of stay; maximum 255 days	Y	Y
Primary Payer	The anticipated principal source of payment for the patient's hospital bill as coded by the hospital.	Y	Y
Principal and Secondary Procedure Dates	Date of procedure.	N	Y
Principal Diagnosis and Up to 19 Secondary Diagnoses	ICD-9-CM diagnosis code.	Y	Y
Principal Procedure and Up to 19 Secondary Procedures	ICD-9-CM procedure code.	Y	Y
Race		N	Y
Readmission indicator	Any patient readmitted to the same hospital within 30 days	N	Y
Same Day Flag	Admission and discharge were on the same day. Not an overnight stay.	Y	Y
Sex		Y	Y
Special Care Unit Days	Number of days spent in a special care unit	Y	Y
Total Charges	Facility charges. See description in Appendix A.	Y	Y
Year of Discharge		Y	Y
ZIP Code	5-digit ZIP code	N	Y
ZIP Code Groups	3-digit ZIP for most of Vermont and all other states; combined 058 and 059 area; 5-digit ZIP for areas with a population over 10,000	Y	Y
ZipTown Code	Groups of towns that share ZIP code(s). See description on pages 30-32.	N	Y

Public use data for resident and non-resident discharges from Vermont hospitals are available by calendar year. To order, contact:

Vermont Department of Health
Public Health Statistics
108 Cherry Street, PO Box 70
Burlington, VT 05402-0070
(802) 863-7300 or (800) 869-2871

Non-public data elements are available for research purposes only. To request non-public data elements, contact:

Division of Health Care Administration
89 Main Street, Drawer 20
Montpelier, VT 05620-3601
(802) 828-2900 or (800) 631-7788

Appendix C: Towns in Vermont Hospital Service Areas

Barre HSA

Barre City	Calais	Middlesex	Plainfield	Washington
Barre Town	Duxbury	Montpelier	Roxbury	Waterbury
Berlin	East Montpelier	Moretown	Topsham	Williamstown
Bolton	Fayston	Northfield	Waitsfield	Woodbury
Cabot	Marshfield	Orange	Warren	Worcester

Bennington HSA

Arlington	Glastenbury	Rupert	Somerset	Wilmington
Bennington	Manchester	Sandgate	Stamford	Woodford
Dorset	Pownal	Searsburg	Sunderland	
Dover	Readsboro	Shaftsbury	Whitingham	

Brattleboro HSA

Brattleboro	Halifax	Putney	Wardsboro	
Brookline	Jamaica	Stratton	Westminster	
Dummerston	Marlboro	Townshend	Windham	
Guilford	Newfane	Vernon	Winhall	

Burlington HSA

Buels gore	Fairfax	Jericho	South Burlington	Williston
Burlington	Ferrisburg	Milton	South Hero	Winooski
Cambridge	Fletcher	Monkton	St. George	
Charlotte	Grand Isle	North Hero	Starksboro	
Colchester	Hinesburg	Richmond	Underhill	
Essex	Huntington	Shelburne	Westford	

Middlebury HSA

Addison	Lincoln	Panton	Vergennes	
Bridport	Middlebury	Ripton	Waltham	
Bristol	New Haven	Salisbury	Weybridge	
Cornwall	Orwell	Shoreham	Whiting	

Morrisville HSA

Belvidere	Elmore	Hyde Park	Stannard	Wolcott
Craftsbury	Greensboro	Johnson	Stowe	
Eden	Hardwick	Morristown	Waterville	

Newport HSA

Albany	Brownington	Ferdinand	Lewis	Troy
Averill	Brunswick	Glover	Lowell	Warner's Grant
Avery's Gore	Canaan	Holland	Morgan	Warren's Gore
Barton	Charleston	Irasburg	Newport City	Westfield
Bloomfield	Coventry	Jay	Newport Town	Westmore
Brighton	Derby	Lemington	Norton	

Randolph HSA

Barnard	Brookfield	Hancock	Rochester	
Bethel	Chelsea	Pittsfield	Stockbridge	
Braintree	Granville	Randolph		

Rutland HSA

Benson	Fair Haven	Mendon	Poultney	Tinmouth
Brandon	Goshen	Middletown Sprgs	Proctor	Wallingford
Castleton	Hubbardton	Mount Holly	Rutland City	Wells
Chittenden	Ira	Mount Tabor	Rutland Town	West Haven
Clarendon	Killington	Pawlet	Shrewsbury	West Rutland
Danby	Leicester	Pittsford	Sudbury	

Springfield HSA

Andover	Cavendish	Landgrove	Peru	Weathersfield
Athens	Chester	Londonderry	Rockingham	Weston
Baltimore	Grafton	Ludlow	Springfield	

St. Albans HSA

Alburg	Enosburg	Georgia	Montgomery	St. Albans City
Bakersfield	Fairfield	Highgate	Richford	St. Albans Town
Berkshire	Franklin	Isle La Motte	Sheldon	Swanton

St. Johnsbury HSA

Barnet	East Haven	Lunenburg	Sheffield	Walden
Burke	Granby	Lyndon	St. Johnsbury	Waterford
Concord	Guildhall	Maidstone	Sutton	Wheelock
Danville	Kirby	Newark	Victory	

White River Jct. HSA

Bradford	Hartford	Plymouth	Sharon	West Fairlee
Bridgewater	Hartland	Pomfret	Strafford	West Windsor
Corinth	Newbury	Reading	Thetford	Windsor
Fairlee	Norwich	Royalton	Tunbridge	Woodstock
Groton	Peacham	Ryegate	Vershire	