

Traditionally, hospital capacity has been measured by the number of staffed beds, and the efficient use of hospital capacity has been measured by the rate at which those beds have been occupied. But this traditional view of capacity was developed when the hospital “product” was predominantly inpatient hospital care.

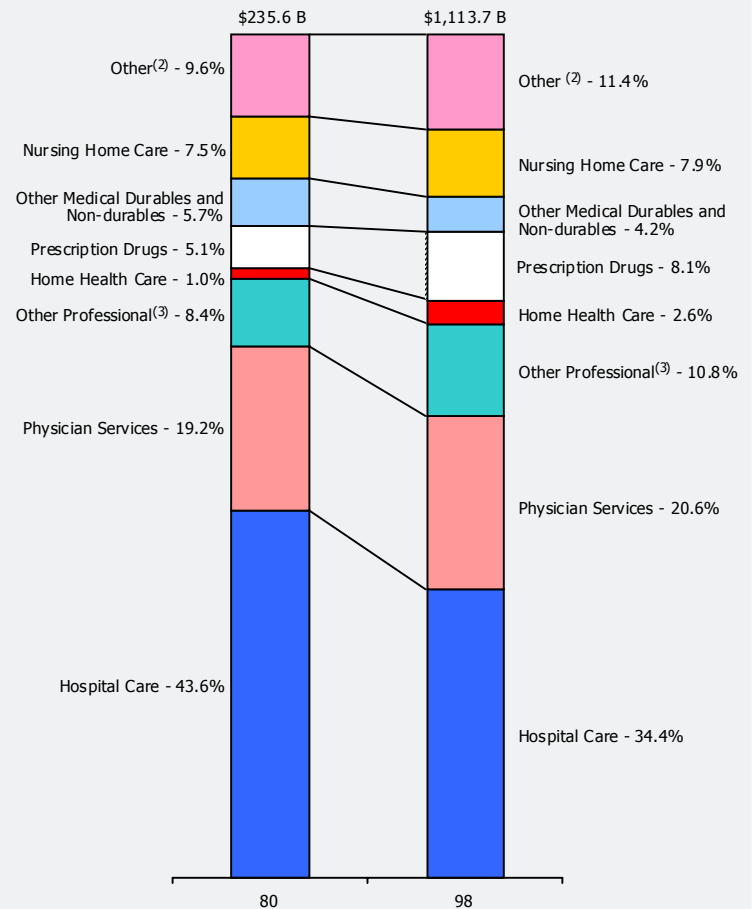
Health care delivery has changed dramatically over the past 20 years and with it the hospital “product.” Medical advances and technological innovations have moved care out of the hospital inpatient setting. Changes in hospital payment, especially Medicare’s adoption of prospective payment and the expansion of managed care, also have altered where and how care is delivered. The decline in inpatient use has led to lower occupancy. Hospitals now use their capacity to deliver care in a variety of settings with, on average, a full third of it delivered on an outpatient basis.

Given these developments, current measures used to gauge the productive use of hospital capacity are increasingly outdated. The traditional measures would have us believe that hospitals are increasingly inefficient because their occupancy rates are lower. But do those rates mean that there is excess hospital capacity, or do they miss the fact that the hospital capacity is being used differently? Does excess bed capacity yield inefficiency and/or increased inpatient utilization? What other measures of capacity might be applied? What are the policy options for ensuring hospital capacity matches current and future demand and that capacity is used efficiently? Or is the market naturally forcing the appropriate adjustments?

*“The issue is not how to fill or reuse empty beds. In this changing environment, hospitals and health systems must focus on streamlining and simplifying operational processes, facilitating case management, promoting the least costly setting for care delivery, and optimizing resource sharing among departments. When hospitals have addressed these issues, then the solutions to the ‘bed problem’ will be obvious,”* Cynthia Hayward in *Health System Review*.

## Hospital care now represents a significantly smaller share of the health care dollar.

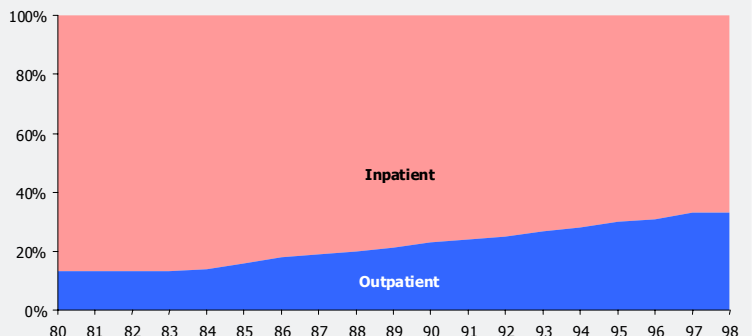
Chart 1: National Health Expenditures for Health Services and Supplies<sup>(1)</sup> by Category, 1980 and 1998



1) Excludes medical research and medical facilities construction  
 2) “Other” includes net cost of insurance and administration, government public health activities, and other health services  
 3) “Other professional” includes dental and other non-physician professional services

## While outpatient services increased to one third of hospital charges.

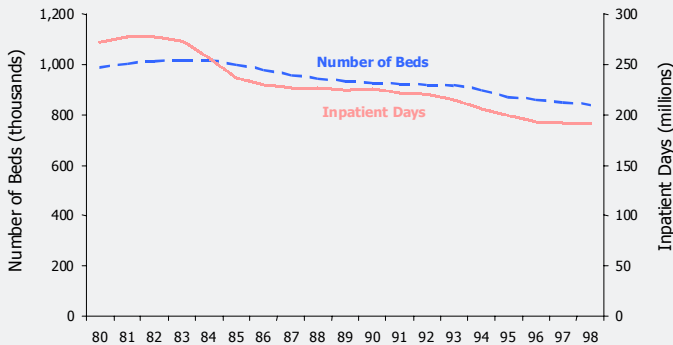
Chart 2: Inpatient vs. Outpatient as a Percent of Total Gross Charges,



# Changes in the Delivery System Have Led to Declining Hospital Occupancy

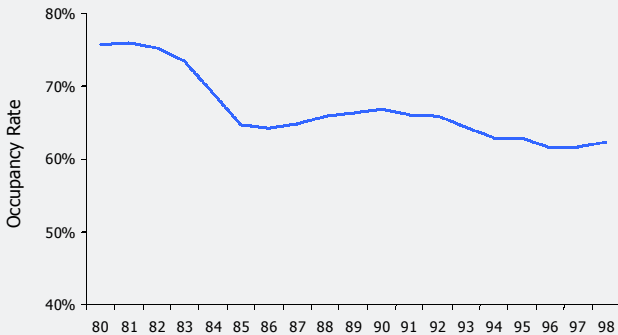
**While staffed beds have declined by 15 percent, inpatient days have declined by 30 percent.**

Chart 3: Number of Staffed Beds vs. Inpatient Days, 1980-1998



**Occupancy dropped sharply especially between 1980 and 1985 when Medicare inpatient PPS was implemented.**

Chart 4: Hospital Occupancy, 1980-1998

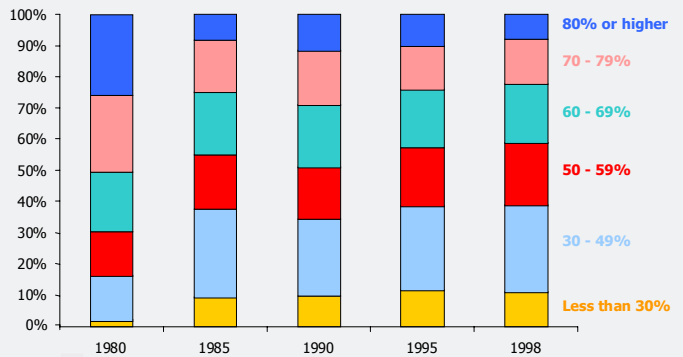


Inpatient occupancy can be measured using licensed beds, operating beds (beds that could be set up in fully functional rooms), and staffed beds (beds set up and staffed for patient care). Staffed beds is the primary measure used in this report. However, many question the precision of this measure. The number of staffed beds reported by hospitals is just a snapshot in time and does not capture the daily fluctuation in staffed beds due to changes in patient volume and the availability of nurses and other health care professionals. Also, observation patients may occupy inpatient beds but are not included in daily census counts.

The decrease in inpatient utilization over the past two decades has led to significant decreases in staffed bed occupancy. Hospital occupancy varies from a high of 72 percent in the Mid Atlantic region to a low of 56 percent in the West South Central region.

**Compared to 1980, more than 4 times as many hospitals had occupancy below 30 percent in 1998.**

Chart 5: Percent of Hospitals by Occupancy Range, 1980-1998

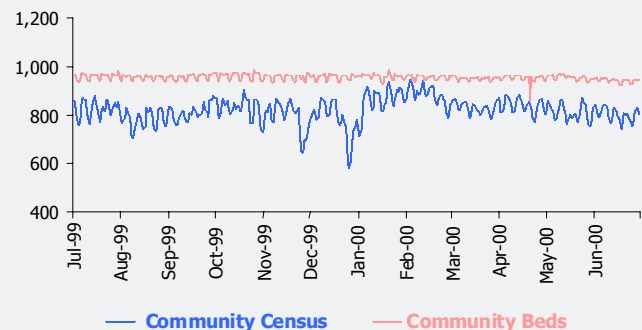


## Census Levels, Staffed Beds, and Occupancy Vary Daily

Community demand for hospital beds varies daily. Over a recent twelve month period, actual demand for medical/surgical and critical care beds in Syracuse, NY varied from a low of 589 to a high of 949 — a swing in demand of 360 beds. Syracuse hospitals were able to adjust the number of staffed beds within a limited range — varying from 860 to 960 — resulting in an average occupancy of 86 percent over the twelve month period. In general, significant variation in inpatient demand contributes to low overall occupancy because hospitals must maintain adequate standby capacity to deal with upward swings in inpatient census. This is especially the case in areas where there is only one facility. Hospitals are increasingly challenged to adjust staffing in today's tight labor market where workers demand consistent schedules and temporary workers are at a premium.

## Managing variation in daily census is a major challenge for hospital administrators.

Variation in Census vs. Staffed Beds in Syracuse Medical/Surgical and Critical Care Beds



Data provided by the Hospital Executive Council, Syracuse, NY

# Bed Supply and Demand are Strongly Linked and Vary Across Regions

The concept of excess capacity is not limited to empty beds. Some speculate that capacity drives demand in health care and that excess capacity leads to over-utilization of hospital resources. Others note that beds have declined at a rate almost equal to the change in inpatient utilization, indicating that decreased demand drives decreased capacity. Hospital executives maintain that care decisions are made by patients and physicians and that capacity is simply a reflection of demand for services. Either way, hospital capacity and age-adjusted utilization rates vary considerably across states, but correlate strongly with each other.

Managed care has been cited as a major factor in driving down demand for inpatient care. But it only explains about 22% of the variation in inpatient use at the state level. Much of the historical drop in inpatient utilization is connected with the implementation of Medicare inpatient PPS.

Inpatient utilization rates are predicted to continue falling over the next ten years. During this period, however, the population will age, driving up utilization. The Lewin Group modeled future inpatient demand levels under three alternative scenarios and looked at how this demand could affect occupancy levels.

**Scenario 1:** Utilization rates are at 1998 levels and the population grows and ages as projected by 2010.

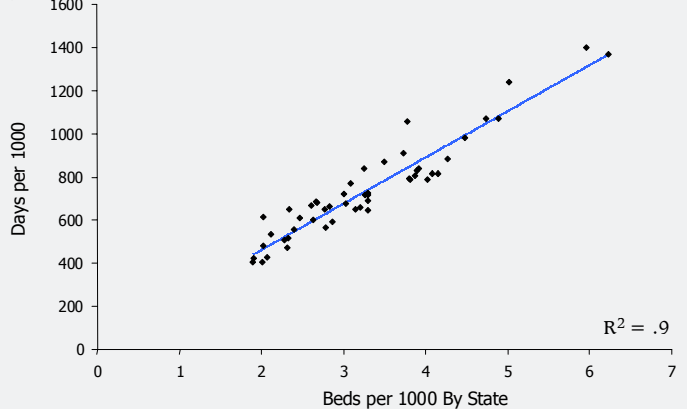
**Scenario 2:** Utilization rates continue to decline as they have over the past 10 years and the population grows and ages.

**Scenario 3:** National utilization rates fall to current California levels and the population grows and ages.

Occupancy levels under each scenario will depend on how hospitals adjust the number of staffed beds as inpatient demand declines. If hospitals do not adjust their level of staffed beds, then occupancy could decline substantially. If hospitals adjust their level of staffed beds at a rate equal to the change over the last ten years, then occupancy will decline less precipitously.

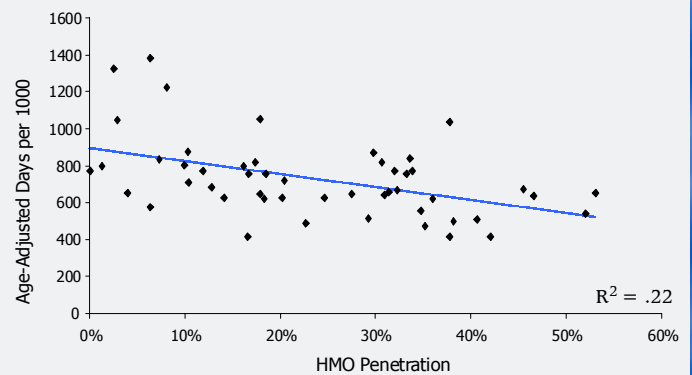
## Utilization rates and bed capacity are strongly related...

Chart 6: Days per 1000 vs. Staffed Beds per 1000 by State, 1998



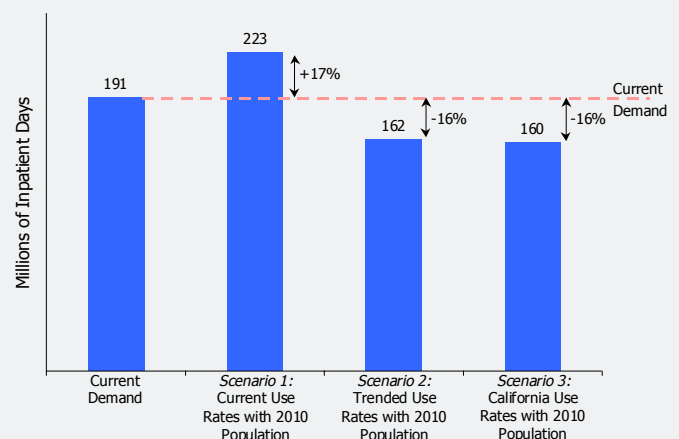
## While managed care penetration explains only about 22% of the variation in utilization.

Chart 7: Age-Adjusted Hospital Days per 1000 Population vs. Managed Care Penetration By State, 1998



## Despite an aging population, inpatient days are likely to drop by at least 16 percent by 2010.

Chart 8: Inpatient Demand, Millions of Inpatient Days, Various Scenarios, 1998 vs. 2010



**"I personally don't believe that a bed is a magnet. Decisions are made between the patient and the physician about the care the patient needs."**

**"Hospital capacity has a dominating influence on hospital utilization rates."**

**- Dartmouth Atlas of Health Care, 1998**

**- Melissa Hungerford  
Kansas Hospital Association**

# Inpatient Occupancy Levels Appear to Have Little Relationship to Hospital Efficiency

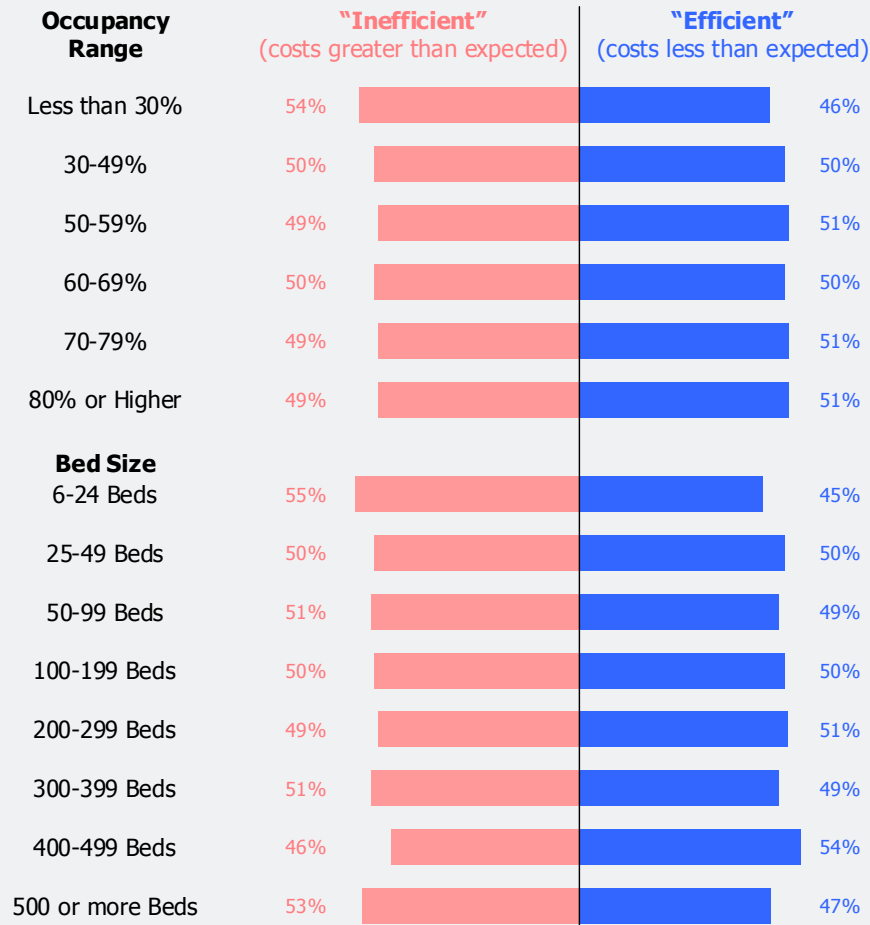
The “excess” capacity debate typically hinges on the question of whether low occupancy leads to inefficiency and whether health care dollars currently tied up in empty beds could be put to better use. An inpatient occupancy rate based on reported staffed beds at a particular point in time is an imprecise measure of capacity utilization. Census and staffing levels vary on a daily basis. A hospital that fluctuates the number of staff with changes in inpatient census can theoretically be efficient over a wide range of occupancy levels as long as there is sufficient volume to cover fixed operating costs.

The Lewin Group has developed a model for predicting Medicare inpatient cost per case for each hospital based on what a “typical” hospital with similar characteristics and average performance would experience. The model compares this predicted cost per case with the actual cost per case of the hospital. A hospital whose actual cost per case is below its predicted cost per case is considered “efficient” in the analysis. Conversely, a hospital that has an actual cost per case that exceeds its predicted cost per case is considered “inefficient.”

When applied to groups of hospitals of different occupancy range and bed size, occupancy does not appear to be a significant contributor to a hospital’s efficiency. Hospitals are slightly more likely to be rated as “inefficient” if their occupancy levels are less than 30 percent. Hospitals with greater than 30 percent occupancy were nearly equally likely to be “efficient” vs. “inefficient.” Bed size appears to have slightly more of an impact on efficiency. These findings support the supposition that other factors such as, how the full range of hospital capacity is used and staffed, are more a determinant of efficiency than simply the presence or absence of excess beds.

## The proportion of hospitals that are “efficient” vs. “inefficient” changes only marginally with occupancy level.

Chart 9: Percent of Hospitals by Efficiency Rating and Hospital Category, 1997

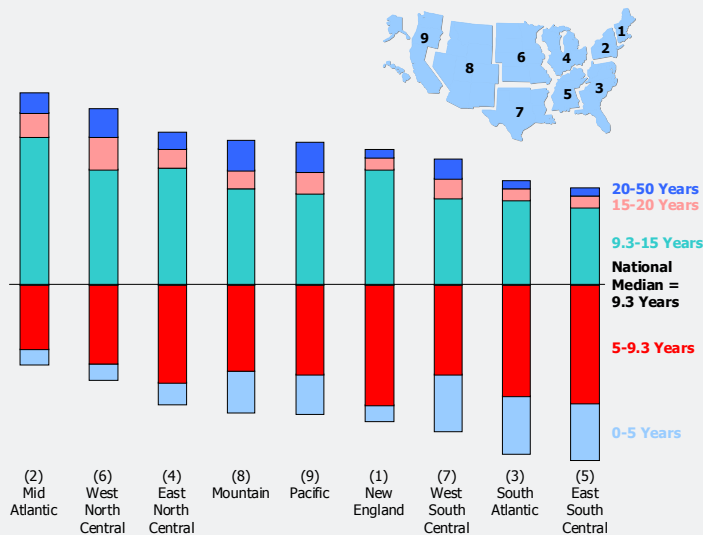


# Construction Continues as Hospitals Modernize and Change Their Service Mix

Despite the declining need for inpatient beds, health care construction continues. Key drivers of construction include the need to maintain modern facilities, serve increasingly populated suburbs, respond to changing care delivery patterns, and maintain competitiveness in the market. Much of the capital financing has been for the renovation and conversion of inpatient capacity into outpatient and other ambulatory facilities. The median age of plant for hospitals is 9.3 years, up from 7.6 in 1988. Rural hospitals tend to have a slightly older age of plant than urban hospitals (9.7 versus 9.0) and hospitals in the Mid Atlantic and West North Central regions are much older than hospitals in other parts of the country. The number of completed hospital construction projects jumped by 16 percent between 1998 and 1999 while hospital construction spending increased by 25 percent.

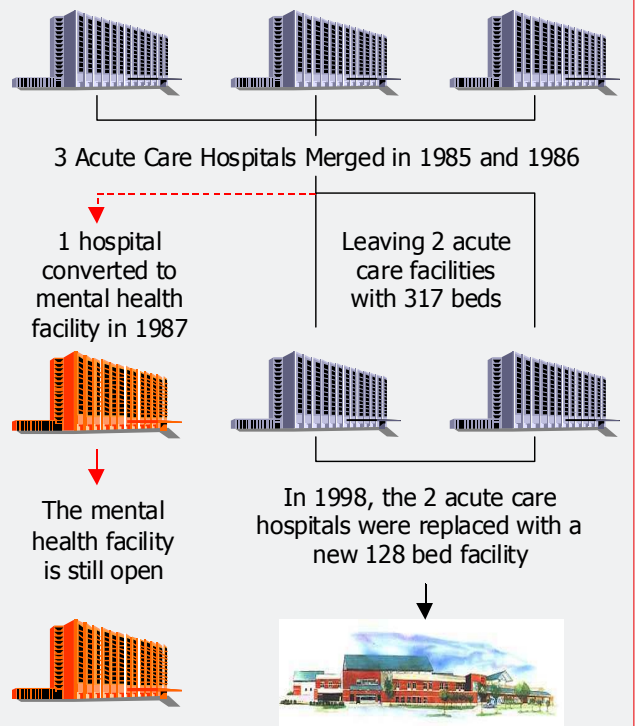
## Hospitals in the Mid-Atlantic and West North Central Regions have the oldest age of plant.

Chart 10: Distribution of Hospitals by Age of Plant, 1997



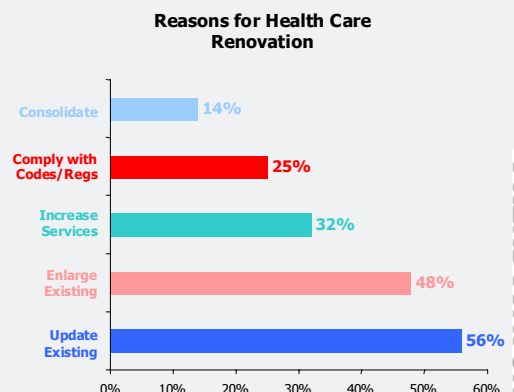
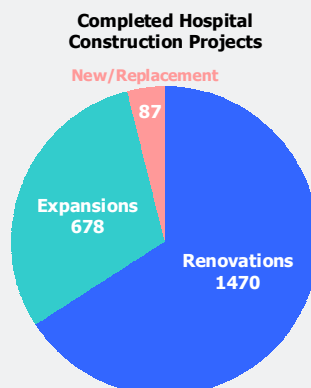
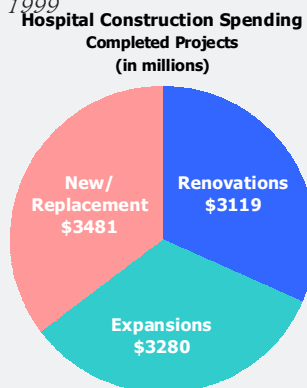
## New Construction: Matching Capacity with Changing Patient Care Needs

Upper Valley Medical Center (UVMC) formed from the merger of three acute care hospitals in Miami County, Ohio. Shortly after the merger, one hospital was converted into a mental health facility. Together, the remaining two hospitals continued to operate 317 acute care beds. In need of renovation and improvements to keep pace with the changing health care environment, UVMC decided to close the two acute care hospitals and replace them with one new facility. Focusing on flexibility, efficiency, outpatient services, and patient-centered care, the new hospital includes 128 inpatient beds, an expanded emergency department, a consolidated outpatient testing area, and an attached medical building. Patient care shifted from inpatient to outpatient settings. The new hospital allowed the physical plant of the hospital to match patient care needs.



## While expenditures are evenly split, renovation projects outnumber other project types.

Chart 11: Distribution of Hospital Construction Projects Compared to Spending by Project Type, and Reasons for Health Care Renovation, 1999



# Policy Issues and Questions

Changes in the health care environment have created the need to redefine how we think about, measure, and manage hospital capacity.

- How can we change hospital capacity and use measures to capture:
  - changing care patterns, especially the shift to outpatient care;
  - beds used for non-inpatient care (e.g., observation hours/days);
  - the importance of available staff in determining actual capacity;
  - the degree of fluctuation in average daily census?
- How much reserve capacity should be supported to ensure that hospitals can handle dramatic changes in patient volume due to flu epidemics, major accidents, natural disasters, and other incidents?
- In an era of rapidly changing technology and tighter access to capital, how do we make sure our capacity keeps pace?
- How can communities and hospitals maintain an appropriate supply of nurses, physicians, and other health care professionals in an increasingly tight labor market?
- Should the regulatory environment provide greater flexibility to manage hospital capacity in a competitive market?
- How should policy makers address capacity, licensure, and standards issues in an environment with an increasing number of alternative care settings?
- How can hospital leaders help their communities and employees embrace the changes needed in the evolution of hospital capacity and services?

## Quotes from the Field

**“We’ve got fixed costs, debt to pay off, utilities to pay. If we got rid of those 1,000 (excess) beds by having each of the (Kansas City area) hospitals close about 33 beds I bet you wouldn’t save a nickel.”** — Tom Cranshaw, strategic planner for Health Midwest.

*“The major factor driving construction cost increases in the past few years has been the pressing need for modernization of old facilities to accommodate technology and Y2K computer upgrades.”* — Camille L. Crosswell in 2000 Construction & Design Survey, *Modern Healthcare*.

**“Even if the population was there and needed hospital care, there are still not enough specialty nurses and other health professionals to staff more filled beds.”** — Linda Quick, South Florida Health and Hospital Association.

*“Until those excess beds come out, you’re going to see hospitals pricing on the margin, not covering fully allocated costs.”* — California CEO.

*“There have been a number of times when we are approaching or exceeding 100-percent occupancy at points during a day.”* — Dr. Brit Nicholson, chief medical officer at Massachusetts General.

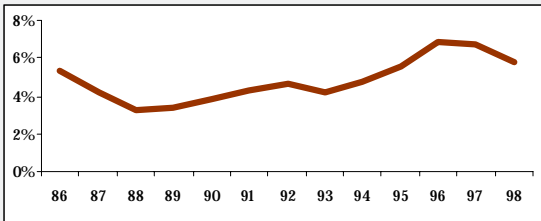
*“We need to come to an agreement on how many beds to report. There are five different ways we could approach this.”* — Jim Hurak, Upper Valley Medical Center, Ohio.

**“A hospital isn’t just like a widget factory. People in Raytown and the surrounding area depended on its location and the long-standing relationships with doctors and nurses that served the hospital.”** — Raytown Mayor Sue Frank.

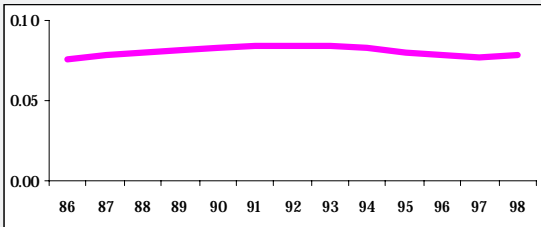
# Stats to know

## Hospital Sector

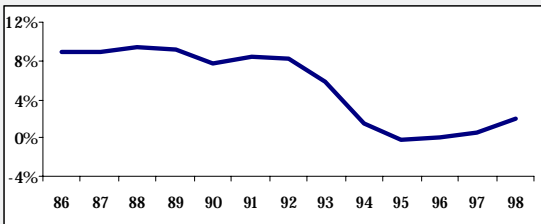
<b>Total Margin:</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
<b>86 to 98 Trend</b>	6.8%	6.7%	5.8%



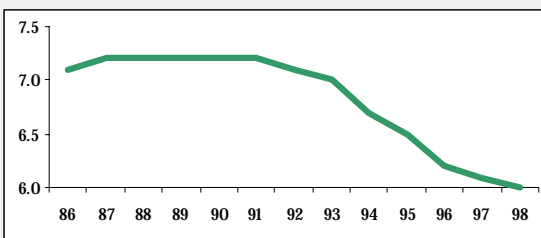
<b>FTE per Adjusted Admission:</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
<b>86 to 98 Trend</b>	0.08	0.08	0.08



<b>Percent Change in Expense per Adj. Admission: 86 to 98 Trend</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
	0.2%	0.6%	2.0%

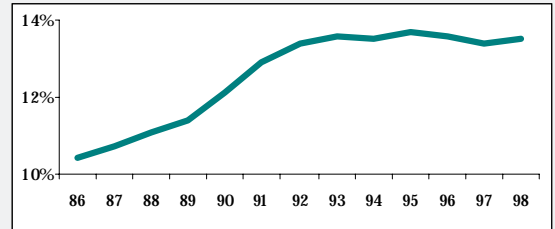


<b>Average Length of Stay (in Days): 86 to 98 Trend</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
	6.2	6.1	6.0

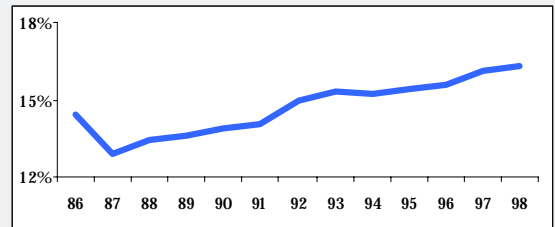


## Healthcare Industry

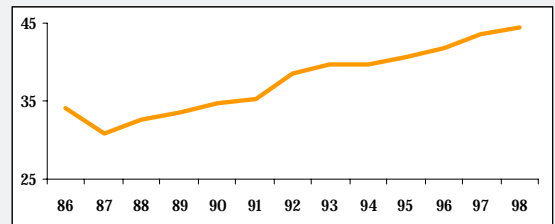
<b>National Health Expenditure as a % of GDP: 86 to 98 Trend</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
	13.6%	13.4%	13.5%



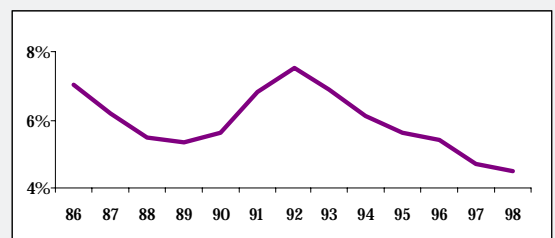
<b>Percent Uninsured: 86 to 98 Trend</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
	15.6%	16.1%	16.3%



<b>Number Uninsured (in Millions): 86 to 98 Trend</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
	41.7	43.4	44.3



<b>Percent Unemployed: 86 to 98 Trend</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
	5.4%	4.7%	4.5%



### **Sources:**

- Chart 1: Health Care Financing Administration, Office of the Actuary  
Chart 2: The Lewin Group analysis of American Hospital Association Annual Survey data 1980 - 1998 for community hospitals  
Chart 3: The Lewin Group analysis of American Hospital Association Annual Survey data 1980 - 1998 for community hospitals  
Chart 4: The Lewin Group analysis of American Hospital Association Annual Survey data 1980 - 1998 for community hospitals  
Chart 5: The Lewin Group analysis of American Hospital Association Annual Survey data 1980 - 1998 for community hospitals  
Chart 6: The Lewin Group analysis of American Hospital Association Annual Survey data, 1998 for community hospitals and US Bureau of the Census data  
Chart 7: The Lewin Group analysis of 1998 American Hospital Association Annual Survey data, Interstudy Competitive Edge: HMO Industry Report 9.2, and US Bureau of the Census data  
Chart 8: The Lewin Group analysis of American Hospital Association Annual Survey data 1980 - 1998 for community hospitals  
Chart 9: The Lewin Group Analysis of Medicare Cost Report data, 1997, and American Hospital Association Annual survey data, 1997  
Chart 10: The Lewin Group Analysis of Medicare Cost Report data, 1997  
Chart 11: Modern Healthcare's Constuction and Design Survey, March 13, 2000

### **Sources for "Stats to Know":**

- Total Margin:* AHA Annual Hospital Survey, 1986-1998  
*FTE/Adjusted Admission:* American Hospital Association Annual Survey, 1986-1998  
*Percent Change in Total Expense per Adjusted Admission:* American Hospital Association Annual Survey, 1986-1998  
*Average Length of Stay:* Hospital Statistics, 1999 Edition, Healthcare Infosource, Inc.  
*National Health Expenditures as a Percent of GDP:* Compiled by HCFA on [www.hcfa.gov/stats/nhe-oact/tables/t1.htm](http://www.hcfa.gov/stats/nhe-oact/tables/t1.htm)  
*Percent Uninsured:* Compiled by Bureau of the Census on [www.census.gov/hhes/www/hlthins.html](http://www.census.gov/hhes/www/hlthins.html)  
*Number Uninsured:* Compiled by Bureau of the Census on [www.census.gov/hhes/hlthins/hlthins.html](http://www.census.gov/hhes/hlthins/hlthins.html)  
*Percent Unemployed:* Compiled by Bureau of Labor Statistics on <http://stats.bls.gov/cpsaatab.htm#empstat>

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*TrendWatch is a series of reports produced by the American Hospital Association and The Lewin Group highlighting important and emerging trends in the hospital and health care field.*

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