

Employment in hospitals: unconventional patterns over time

*Numbers of jobs in hospitals are affected
by a variety of special influences;
the industry does not conform to the business cycle*

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Employment in hospitals is subject to influences that are not related to the business cycle and responds to the business cycle in an unusual way. The trends of employment in hospitals therefore contrast with those of total employment, especially during cyclical downturns. Apart from the effect of the business cycle, demographic and technological changes influence hospital job growth in both upward and downward directions. In relation to the business cycle, job growth in hospitals is greater when gross domestic product (GDP) is weak, when unemployment is high, and when overall hiring declines. This article first takes up influences other than the business cycle and then explains the countercyclical pattern of growth in employment. One cyclical influence in particular—variations in the labor shortage in the industry—is examined in detail.

In this article, the Current Employment Statistics survey¹ is the primary source of statistics representing employment. Two particular time series from the survey are emphasized. One represents employment in all hospitals, including private and Federal, State, and local government establishments.² The other represents employment just in privately owned general medical and surgical hospitals (NAICS 6221). The latter series offers a longer history, since 1958; the former starts in 1990. The more restricted series, then, can be used for longer term analyses. Whenever possible, however, the broader hospital series is used to generate conclusions about the entirety of the hospital industry, both public and private.

Persistent trends

Although this article primarily concerns cyclical patterns in hospital employment, a few important

influences that have persisted for long periods also are examined. Changes in the size and nature of the U.S. population, advances in medical technology, and changes in the extent and characteristics of private and public health insurance are among the long-term factors.

Demographic changes. The population over age 65 increased more than tenfold during the 20th century, and the elderly as a proportion of the population increased about threefold in the last hundred years, to 12 percent in 2000. The proportion of Americans over 65 increased in every 20th-century decade except the nineties, when it declined by just 0.1 percentage point. Even in the nineties, those over 65 increased in number; and during the nineties, the oldest age group (people over 75) increased as a proportion of the total population.³ A glance at statistics representing inpatient hospital care by age group confirms that, after infancy, the need for hospital services increases greatly with age.⁴

Age, years	Days of hospital care per 1,000 persons, 2003
All ages	578
Under 1	1,218
1 to 4	149
5 to 14	108
15 to 24	268
25 to 34	353
35 to 44	359
45 to 64	582
65 to 74	1,429
75 and older	2,776

Greater demand for hospital services, then, is a function of, among other things, the increasing numbers of elderly individuals.

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Even disregarding the aging of the population, the overall growth in the number of U.S. residents drives some of the increase in demand for healthcare. From 1990 to 2004, the resident population increased by 44 million, or 18 percent.⁵

Technological change. Both information technology and medical technology have changed the nature of work at hospitals. Advances in information technology, such as the electronic processing of billing documents, clearly tend to increase efficiency,⁶ but the overall effect of new medical technology on hospital staffing requirements is ambiguous. One publication cites the discovery and implementation of treatments “that cure or eliminate diseases” and “shifts to other sites of care . . . as technology allows” as “factors that may decrease health services utilization.”⁷ At the same time, “factors that may increase health services utilization” include “new procedures and technologies” (for example, hip replacement).⁸ The net effect of medical advances on hospital employment is not definitely known to be either positive or negative. Statistical analysis using numbers of Food and Drug Administration (FDA) approvals of medical devices⁹ characterized by that agency as “significant,” “break-through,” or “important”¹⁰ exhibited no definitive relationship between the numbers of major device approvals and annual percent changes in hospital employment.¹¹

Certain pharmaceutical developments have reduced the need for hospitalization substantially. The mental health field is especially noted for new pharmaceutical products that shorten hospital stays or allow shifts from the hospital setting to a residential setting.¹² Indeed, unlike hospitals in general, private mental and drug abuse hospitals and State hospitals show long-term *declines* in employment.¹³

Furthermore, new drugs for the treatment of HIV infections have been relatively successful in postponing or preventing the development of AIDS. From 1987 to 2004, the FDA approved some 24 medications for HIV infection.¹⁴ Treatment with drugs “has improved steadily since the advent of combination therapy in 1996. More recently, new drugs have been approved, offering added dosing convenience and improved safety profiles, while some previously-popular drugs are being used less often as their drawbacks become better defined.”¹⁵ Because of pharmaceuticals and through changes in behavior,¹⁶ the AIDS epidemic, once feared as likely to become overwhelming to the healthcare industry, in fact declined after the middle nineties.¹⁷ On broad fronts, then, new pharmaceutical products have reduced the need for hospitalization.

Changes in health coverage. Private health insurance and public funding of healthcare have undergone numerous important changes in recent decades. To begin with, the

percentage of the population with no health insurance has risen from 13.9 percent in 1990 to 15.7 percent, or 45.8 million individuals, in 2004. At the same time, the percentage covered by private insurance has fallen by 5.1 percentage points, while the percentage covered by government insurance, particularly Medicaid, has risen. Those with no insurance utilize health services to a lesser extent than those who have health insurance, and the per capita hospital expenditures of Medicaid enrollees are considerably less than those of the overall population.¹⁸ These developments have restrained the growth of healthcare.

Along with the decline in the percentage of the population covered by private insurance, the percentage of total hospital expenditures paid through private insurance fell slightly from 1990 to 2003.¹⁹ Multiple changes in the nature of private insurance have affected the demand for hospital care. Health maintenance organizations (HMO’s), defined as health plans that provide more or less comprehensive healthcare by the plan’s own providers, primarily in exchange for a fixed regular payment, often regulate access to specialists and, in some cases, hospitalization, through their primary care physicians. Certain mechanisms in the operation of HMO’s—especially authorizations required for particular treatments—in effect limit the consumption of healthcare services.²⁰ HMO’s, however, “led the way in expanding benefit coverage to maternity, mental health, preventive, and pharmaceutical services.”²¹ Although enrollment in HMO’s declined between 2000 and 2003, the rise was so great in the preceding decade that the net change from 1990 to 2003 was an approximate doubling of the proportion of the population enrolled. In 2003, 24.7 percent of the population was covered by HMO plans.²² In recent years, a shift toward health insurance plans with greater out-of-pocket costs to the consumer, accompanied by coverage of more types of care, is likely to have made the health consumer somewhat more cost conscious. James C. Robinson refers to “the all-too-human tendency to spend other people’s money with less care than one’s own.”²³ Thus, the complex set of changes in private health insurance has exerted both upward and downward influences on the demand for healthcare.

Government health insurance programs also have undergone numerous changes intended to control costs; those programs and their changes will be described in more detail with respect to the business cycle in a later section.

From 1990 to 2003, the proportion of total hospital expenditures paid by private insurance and government funds crept up from 91.5 percent to 92.7 percent. This measure, however, cannot be used as the sole basis for determining the overall influence of changes in insurance on hospital job growth. More subtle factors, such as the availability of new treatments unknown in 1990, also are involved in the picture of health insurance benefits and costs.

Downward influences

The forces restraining the growth of hospital employment are clearly substantial, opposing the overall growth of the population and the increasing number of elderly people, as well as the upward influences of some new procedures being performed at hospitals. Consequently, hospitals have cut jobs, merged with other hospitals, and outsourced a variety of functions, including food preparation, transcription, and information technology.²⁴ The rest of this section describes some major downward influences.

Competition from other venues. A shift toward treatment in outpatient settings has increased employment in offices of physicians and other ambulatory venues such as outpatient surgery centers. Chart 1 shows that jobs in healthcare have grown more in purely outpatient settings than in hospitals. Even within hospitals, a shift from inpatient treatment to outpatient treatment has been noted.²⁵ While relative costs are one reason for this shift, consumer preferences are another,²⁶ and, as noted earlier, technological advances are partly responsible. Ambulatory surgery is perhaps the greatest shift that has been made possible by improved technology.²⁷

Length of stay. Both the average length of inpatient hospital stays and the number of days of care per thousand persons

fell considerably from 1990 to 2003.²⁸ As the length of stay is reduced, staffing needs per case also are reduced. Hospitals are motivated to decrease lengths of stays because of the structure of reimbursements from Medicare and managed care programs.²⁹ In addition, advancing technology shortens the time required for certain treatments in the hospital.

Overall long-term effects. Both the persistent upward influences and the downward long-term influences are multiple and strong. The restraining influences have held the rate of growth in hospital jobs below that of the overall population and below the rate of growth of payroll jobs in general. (See table 1 and chart 2.)

History of employment in private hospitals

Although estimates of total hospital employment are available only from 1990 to 2005, data on the history of employment in private general and surgical hospitals are available starting in 1958. Accordingly, it is possible to investigate briefly the economic behavior of that major part of the hospital industry over several decades. (Private general and surgical hospitals represent about three-quarters of the employment of the entire public and private hospital industry.) Just looking at a line graph of employment in private general and surgical hospitals (chart 3) reveals that recessions do not particularly

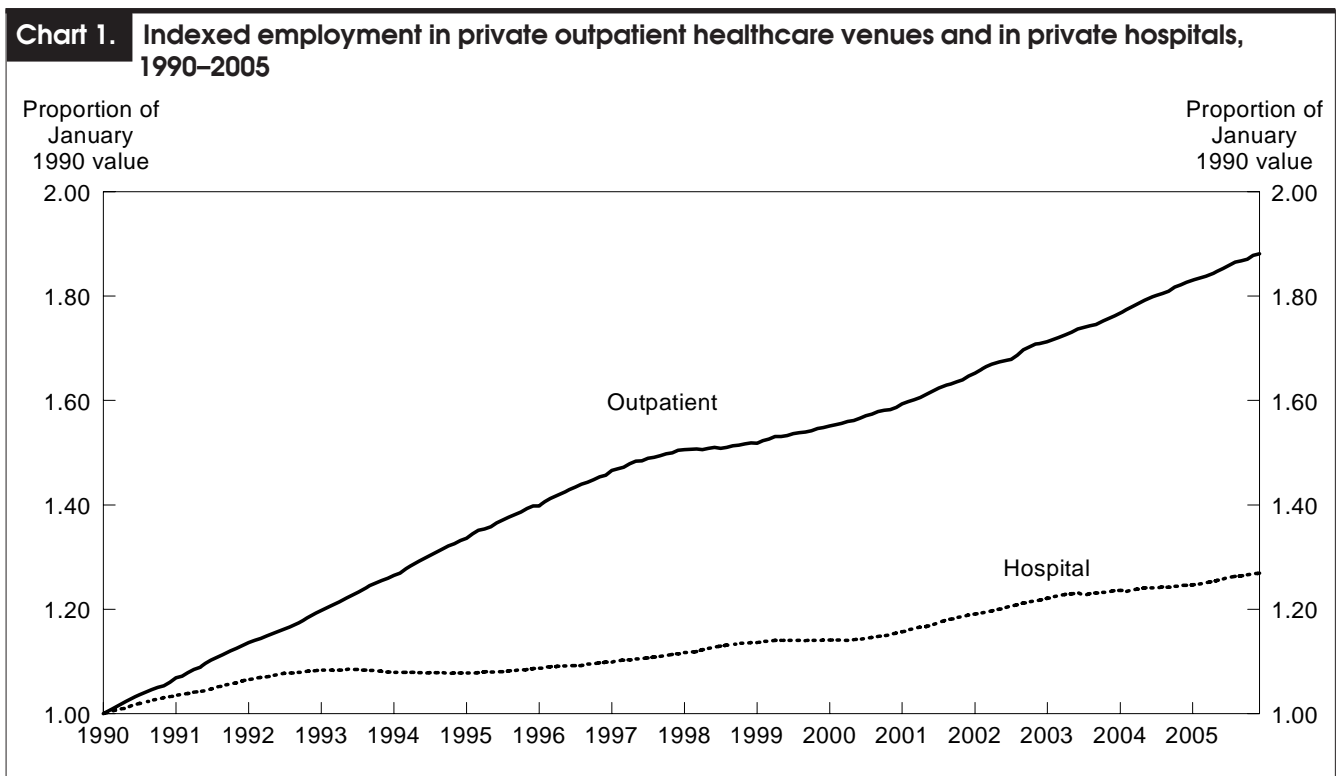


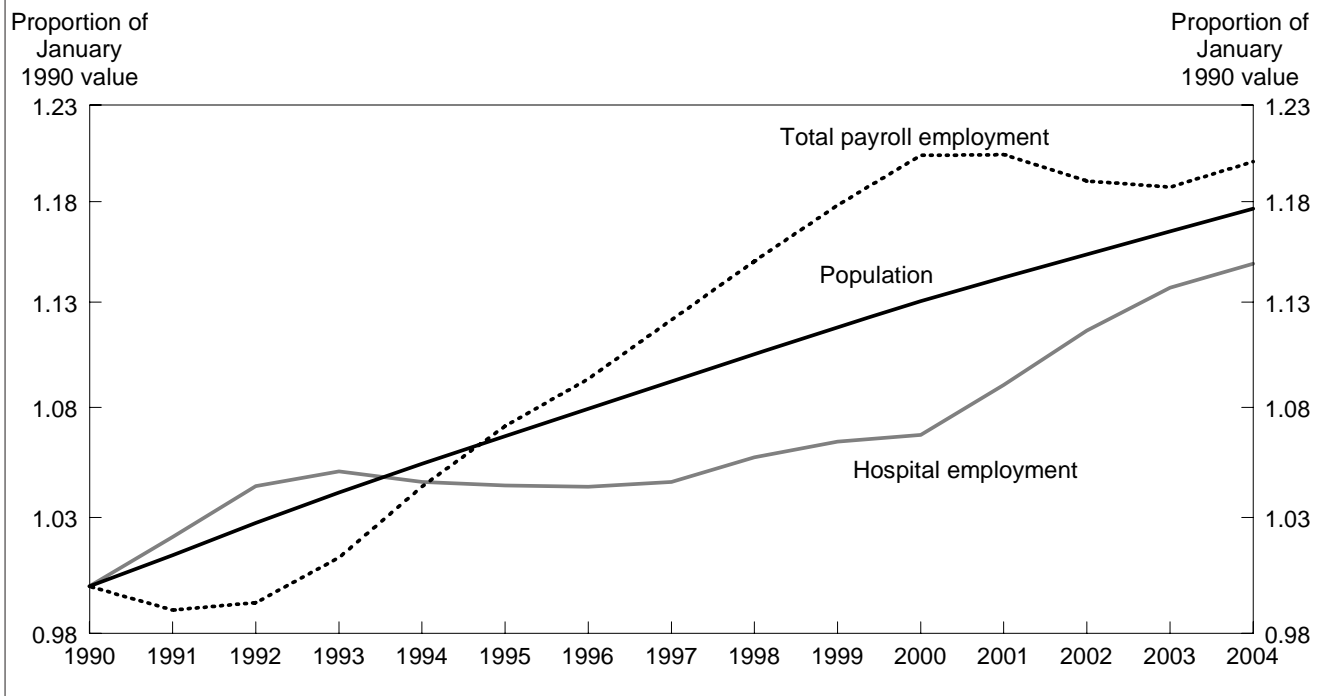
Table 1. Numbers of jobs in all hospitals, in ambulatory healthcare, and in all nonfarm establishments, 1990–2005

Year	Hospitals		Ambulatory healthcare		Nonfarm establishments		U.S. resident population	
	Jobs in thousands	Annual percent change	Jobs in thousands	Annual percent change	Jobs in thousands	Annual percent change	Thousands	Annual percent change
1990	4,817	...	2,842	...	109,487	...	249,623	...
1991	4,920	2.2	3,028	6.6	108,374	-1.0	252,981	1.3
1992	5,029	2.2	3,200	5.7	108,726	.3	256,514	1.4
1993	5,061	.6	3,386	5.8	110,844	1.9	259,919	1.3
1994	5,038	-4	3,579	5.7	114,291	3.1	263,126	1.2
1995	5,031	-1	3,768	5.3	117,298	2.6	266,278	1.2
1996	5,028	-1	3,940	4.6	119,708	2.1	269,394	1.2
1997	5,038	.2	4,093	3.9	122,776	2.6	272,647	1.2
1998	5,092	1.1	4,161	1.7	125,930	2.6	275,854	1.2
1999	5,126	.7	4,227	1.6	128,993	2.4	279,040	1.2
2000	5,141	.3	4,320	2.2	131,785	2.2	282,192	1.1
2001	5,253	2.2	4,462	3.3	131,826	.0	285,102	1.0
2002	5,377	2.4	4,633	3.8	130,341	-1.1	287,941	1.0
2003	5,477	1.9	4,786	3.3	129,999	-3	290,789	1.0
2004	5,534	1.0	4,952	3.5	131,435	1.1	293,655	1.0
2005	5,609	1.4	5,110	3.2	133,463	1.5	(¹)	(¹)
Average	(²)	1.0	(²)	4.0	(²)	1.3	(²)	1.2

¹ Data not available.

² The average number of jobs in thousands, though calculable, is not economically meaningful.

Chart 2. Indexes of employment in hospitals, U.S. resident population, and total payroll employment, 1990–2005



slow growth. Even before the existence of Medicare (which started in 1966), the private general and surgical hospital industry grew through periods of recession in 1958, 1960, and 1961, as well as later, when Medicare was in place.

Nevertheless, one sees three definite plateaus or declines in employment: one from 1982 to 1986, one from 1992 to 1995, and one from 1998 to 2000. The first and last coincide with restrictions in Medicare spending. In 1982, the Tax Equity and Fiscal Responsibility Act started a shift from retrospective payment, which covered costs of the actual treatment, to prospective payment, which led to generally smaller reimbursement amounts standardized on the basis of diagnosis. The prospective payment system was fully enacted in 1983.³⁰ In 1997, Operation Restore Trust—a crackdown on fraudulent billing³¹—and the Balanced Budget Act restrained spending.

The remaining plateau—in fact, including a small decline—in employment in private general and surgical hospitals, from 1992 to 1995, does not correspond to any major change in government funding rules, but did occur at a time when the possibility of reform in healthcare policy was a major issue. It seems that uncertainty was an important restraining factor in hiring.

Countercyclicality

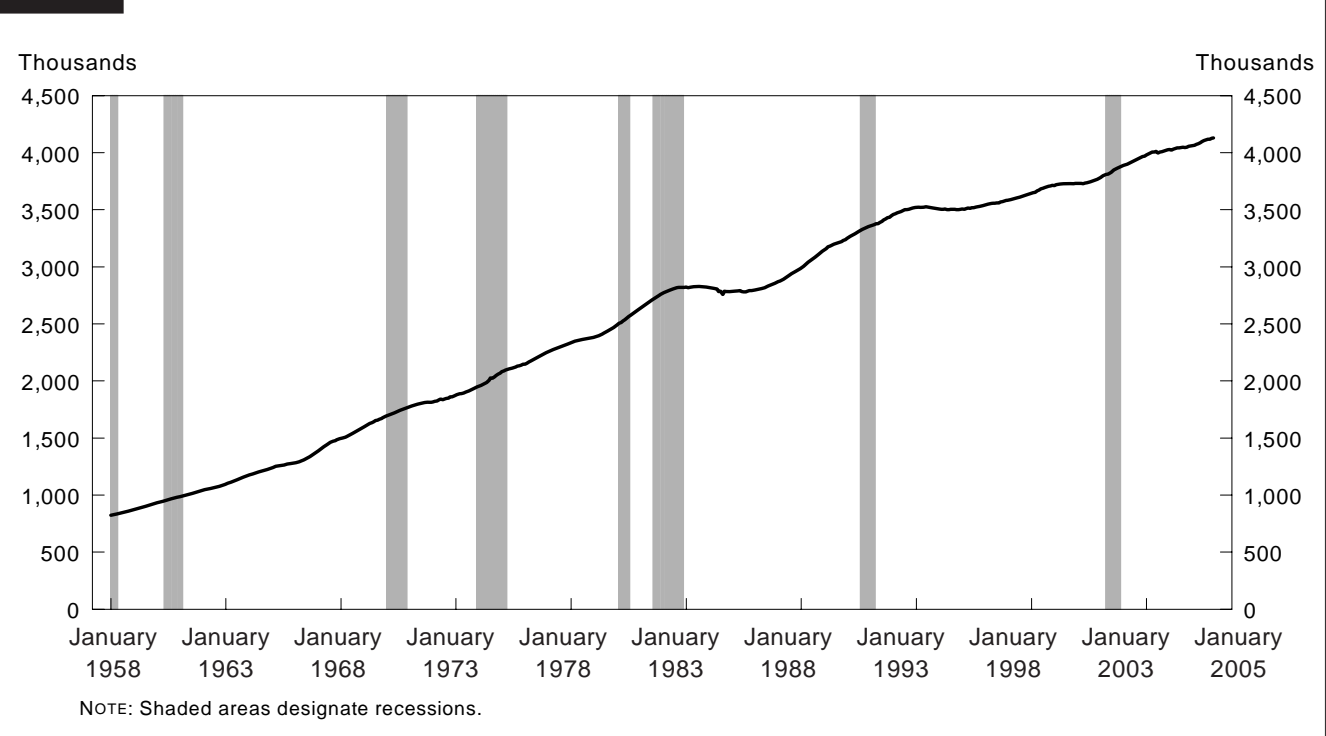
Now consider again the entire hospital industry. As mentioned previously, hospital employment as a whole varies in response

to the business cycle, but not as one might expect. Although employment in the hospital industry has increased almost constantly since 1990, changes in its rate of increase are opposite to those of GDP and of total payroll employment. Furthermore, when unemployment rises, so does the rate of job growth in hospitals. While the trend of employment in all hospitals combined is consistently upward, the *rate* of growth may be described as countercyclical: when general business conditions are weak, hospital employment exhibits greater growth.

Health of the population. In order to see how the growth or decline in total U.S. employment correlates with the demand for hospital services, the movements of total payroll employment were compared with the movements of certain indicators of hospital workload in the years 1993 to 2002. (See chart 4.) Year-to-year changes in the number of hospital discharges, which represent the number of inpatient cases, tend to move opposite to the changes in total payroll employment. Days of inpatient care and the average length of stay also exhibit a pattern in opposition to that of total payroll employment.³²

One possible reason for the countercyclical pattern might be an improvement in the general health of the population as business conditions improve. If health does improve as economic growth increases, demand for hospital services would tend to decelerate as the economy expands. Evidence, however, indicates that health actually is better when busi-

Chart 3. Employment in private general and surgical hospitals, seasonally adjusted, 1958–2005



ness is slow. Christopher J. Ruhm, in the *Quarterly Journal of Economics*, finds that physical health is better during recessions. He shows that eight major causes of death occur more frequently during economic expansions, finds that tobacco use increases along with economic activity, and provides evidence that “physical activity rises and diet improves when the economy weakens.”³³ The general state of health therefore quite possibly exerts a procyclical influence on demand for hospital services. Certainly, job stress, as well as joblessness, causes health problems in many individuals, and some evidence suggests that increased workloads in recent years have contributed to illness.³⁴ The countercyclical forces, then, would have to be all the more powerful to overcome the procyclical fluctuations in illness.

If health does not deteriorate during business slowdowns, how is it that the amount of hospital inpatient work tends to be greater during those same periods? There are several possible explanations. Ruhm mentions “the opportunity cost of time”: the possibility that some people are more reluctant to undergo medical care when it would interfere with their income or career. While the opportunity cost of time probably has little effect on vital inpatient procedures, elective procedures may be affected. Slack business or unemployment may

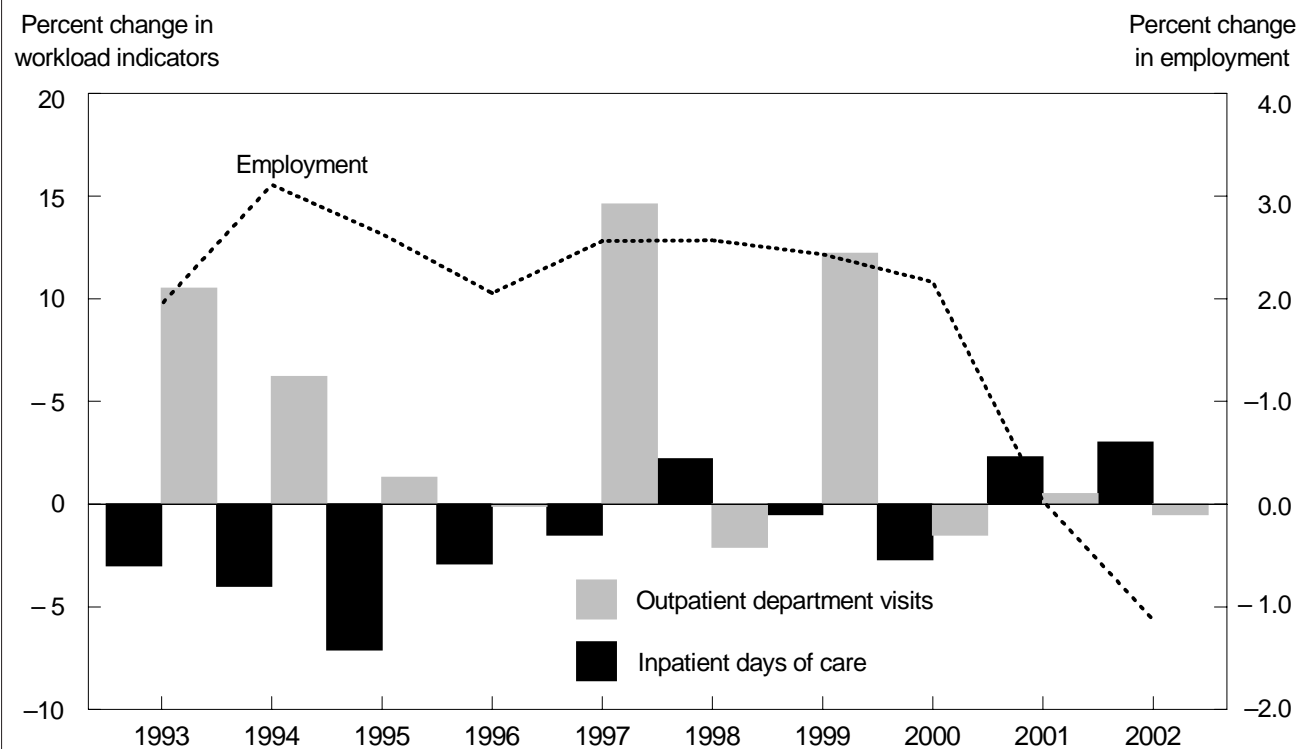
reduce time conflicts, tending to boost hospital business when economic activity is low.³⁵

Other explanations for more inpatient business during economic slowdowns also are possible. Unemployment and the consequent loss of employer-provided coverage may make some people unable or unwilling to get medical attention until hospitalization becomes necessary. The Medicare and Medicaid programs make hospitalization more affordable than it would otherwise be for some groups during periods of unemployment or reduced business; those who have only Medicare part A are covered just for hospitalization, as opposed to office visits. Furthermore, at times of peak U.S. hiring, when the labor shortage in hospitals may be particularly intense, hospitals with staffing shortages may face restrictions on the volume of business that can be performed at a particular time.

Year-to-year changes in the number of hospital *outpatient* visits, however, tend to move in the same direction as the changes in total payroll employment.³⁶ Outpatient business, then, serves to reduce the countercyclical pattern of hospital employment and helps hospitals compete with ambulatory venues.

Labor supply. One countercyclical force affecting the hospital industry is the labor shortage in some healthcare

Chart 4. Percent change in total payroll employment and in selected indicators of hospital workload, 1993–2002



occupations, a reflection of which might be the rate of job vacancies in hospitals.³⁷ A continuous national time series of hospital vacancies, however, appears not to exist.³⁸ Nevertheless, evidence of a shortage is abundant. Most often mentioned as in short supply are nurses, but personnel in other hospital occupations—laboratory scientists, pharmacists, radiologic technologists, and radiation therapists—also are cited as scarce.³⁹ Among the major reasons for the shortage of nurses are the following:

- “Operating rooms and post-surgical units, both of which tend to be staffed by older, experienced nurses, lose workers to retirements. Intensive-care units go wanting because the young women who once gravitated to the physical and mental demands of those jobs are being attracted to non-nursing careers. . . .
- “Women, who make up the overwhelming majority of health-care workers, no longer are guided to pink-collar career tracks, and they are choosing more lucrative fields, including technology and business. . . .
- “. . . experienced nurses are leaving the profession or are shifting to nursing jobs out of the hospital because they are dissatisfied. Hospital nursing is stressful, and that is made worse by inadequate staffing and excessive workloads.”⁴⁰

Julie Pinkham, executive director of the Massachusetts Nurses Association, provides an additional perspective: “What’s driving nurses out of the field is going to work knowing you can’t do an adequate job.”⁴¹ Because lower staffing levels result in greater dissatisfaction, the nursing shortage is exacerbated and perpetuates itself.

The permanently low unemployment rate in the hospital industry is additional evidence that hospital labor is harder to find than most other labor. From 1976 to 2002,⁴² the unemployment rate of experienced hospital wage and salary workers⁴³ was always well below the unemployment rate of all workers. The mean difference between the two rates was 3.8 percentage points, and the minimum difference was 2.7 percentage points.

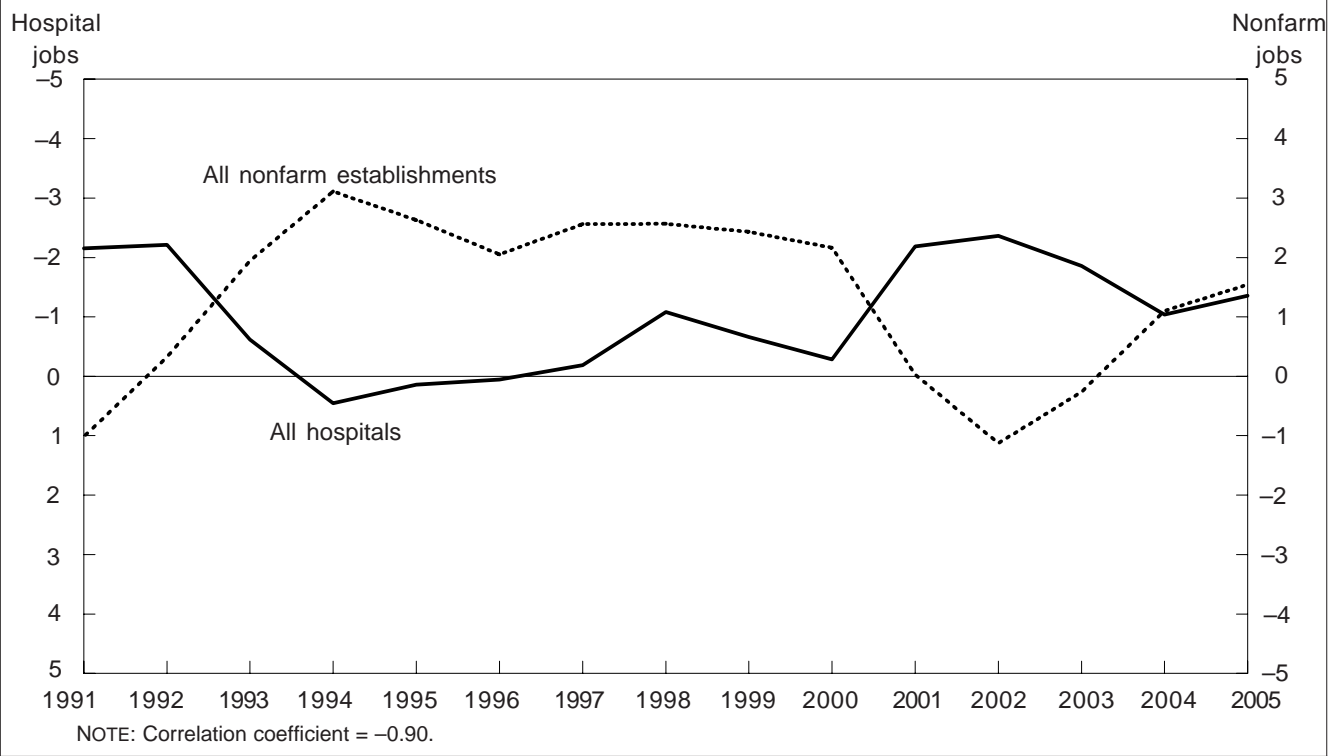
Hospital labor shortages can be expected to increase when alternative job opportunities are abundant and to decrease when opportunities are scarce. Chart 5 shows annual percent changes in hospital employment and in total payroll employment, the latter shown on an inverted scale. The inverse relationship is clear and is also apparent from a correlation coefficient of -0.90 .⁴⁴ Thus, a very strong inverse relationship between the two variables has been established. That relationship is considerably stronger than those between any of the aforementioned indicators of hospital workload and change in hospital employment. The rates of change of employment in hospitals also exhibit move-

ments opposite to the overall rate of gross job gains,⁴⁵ opposite to changes in GDP, and in the same direction as changes in the unemployment rate. The relationship between hospital employment and general unemployment—hospital jobs tend to grow slowly when unemployment is low and faster when unemployment is high—suggests that some workers take hospital jobs only when other jobs are scarce. Changes in hospital employment exhibit a much closer relationship to gross job gains than to gross job losses, a fact which suggests that alternative job opportunities may have a greater cyclical influence on hospital staffing than does fluctuating demand for hospital services.

The longer history of employment in private general and surgical hospitals reveals an increasingly inverse relationship between employment in the industry and total U.S. payroll employment over the decades. One explanation for the increasing strength of the relationship may be a hospital labor shortage that became more sensitive to the business cycle as more job opportunities became available to women. In 1958, women constituted 33 percent of the employed; by 2005, they had expanded their share to 46 percent.⁴⁶ Private general and surgical hospitals continue to depend primarily on women to fill jobs and face much more competition in recruitment and retention. According to Dolores Hopper, vice president of patient care at Goodall Hospital, women now have more career opportunities than ever before, and nurses can now work for medical software or pharmaceutical companies, which offer better benefits and conditions than hospitals do.⁴⁷ During the sixties, a small negative correlation (correlation coefficient of -0.15) existed between employment in private hospitals and total payroll employment. By 2005, the two employment series had become much more negatively correlated.

Earnings, hours, and the labor shortage

One might expect that, as hospitals attempt to attract more workers, hospital pay would increase in response to the industry’s labor shortage and hours would increase when hiring is difficult. Although data on hours and earnings in government hospitals are not available from the Current Employment Statistics program, earnings in private hospitals can be examined. On its surface, the overall trend of hourly earnings in private hospitals from 1990 to 2005 would appear to support the claim that a labor shortage exists. Indeed, over the 15-year period, earnings increased by an average 3.9 percent per year, far more than the 3.1-percent average increase in earnings in total private industry. Because total private earnings undoubtedly have been influenced by intraindustry shifts, the change in hospital earnings also was compared with those of 13 large private-industry sectors.⁴⁸ The average percent increase in private hospital earnings far exceeded those of all sectors except financial activities.

Chart 5. Percent change of employment in all hospitals and in all nonfarm establishments, 1991–2005

A year-by-year analysis of changes in earnings in private hospitals, however, does not obviously support the case for a fluctuating labor shortage. Private hospital earnings, deflated by the Consumer Price Index, tend to rise more rapidly in years of low or even negative growth in total payroll jobs. One might expect hospitals to raise pay most when competition for workers is most intense. Instead, hospital pay increases most when broad hiring is low. Certain factors, such as Medicare, Medicaid, and private insurance restrictions, may prevent hospitals from changing pay scales quickly. Indeed, large Medicare and Medicaid cutbacks have occurred during times of economic expansion.

One also would expect the average workweek to expand when labor is short. Average weekly hours in private hospitals grew by an average 0.2 hour per year since 1990, while hours for all private workers declined by an average 0.03 hour during the same time span. Hospital hours show little or no cyclical pattern.

Government dollars

A separate influence on the number of hospital jobs consists of changes in government funding for healthcare. Total real government expenditures on hospitals exhibit year-to-year percent changes that fluctuate mostly in the opposite direc-

tion from those of real GDP. As shown in chart 6, hospital employment and real government expenditures on hospital services have some tendency to accelerate and decelerate together. Because Federal, State, and local government now contribute well over half of hospital funding, the influence of government funding on hospital employment is almost inevitable.⁴⁹

In 1997 and 1998, years of relatively high increases in GDP, substantial tightening of government funds for healthcare had an impact. In 1996, welfare reform had come, and those receiving cash assistance were no longer automatically eligible for Medicaid.⁵⁰ Additional changes in 1997 included the establishment of optional managed care within the Medicare program and prospective payment for outpatient hospital services.

In 1998, total real government funding of hospital services hardly increased, in stark contrast to preceding years; and in 1999, government funding increased only modestly. The Balanced Budget Refinement Act of 1999 “increased payments for some Medicare providers and increased the amount of Medicaid DSH⁵¹ funds available to hospitals in certain States and the District of Columbia,”⁵² thus permitting total real government funding of hospitals to accelerate rapidly in 2001; funding continued to increase at a rapid pace in 2002. Clearly, then, government hospital expenditures have fluctuated in a pattern largely opposite to that of real GDP

and have contributed to the countercyclical pattern of hospital employment.

Uncertainty

In the middle nineties, the trend of hospital employment was somewhat below what one might expect. We may ask, then, what influences might have reduced hiring at that time. One factor appears to have been an uncertain outlook in the area of future government policy toward healthcare. In the early nineties, the Clinton Administration established a task force to reform the U.S. healthcare system.⁵³ Uncertainty about the future of healthcare was unusually high. In the absence of a way to quantify uncertainty among healthcare executives, however, the effect on hiring cannot be estimated.

Specific types of hospitals

So far, the emphasis in this article has been chiefly on the hospital industry as a whole, including both privately owned and publicly owned institutions. This section examines various types of hospitals separately. The detailed hospital time series available from the Current Employment Statistics program consist of data on private general and surgical hospitals, private mental and drug abuse hospitals, other private specialty hospitals, Federal hospitals, State hospitals, and local government hospitals. All

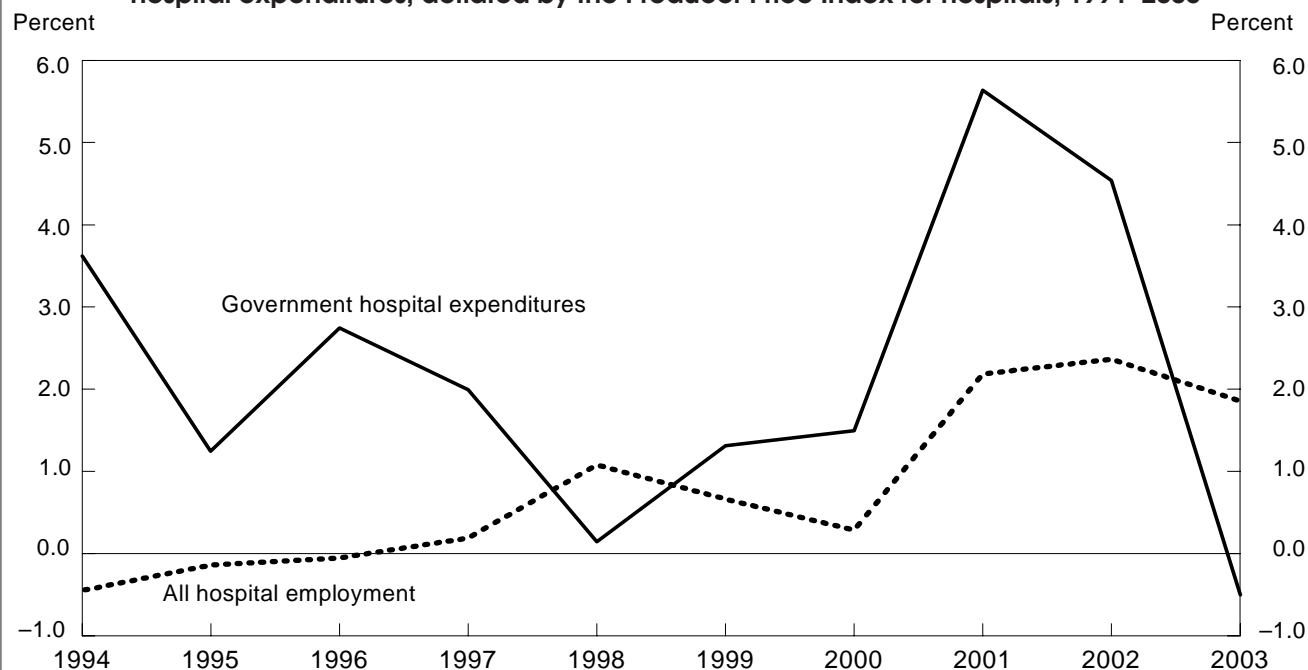
six show some countercyclical tendency, with accelerations and decelerations in employment opposite to those of total U.S. payroll employment, and all except Federal hospitals exhibit statistical significance in their correlation with total payroll employment. The degree of correlation with total employment varies a great deal, however. The absolute value of the correlation coefficient indicates the strength of the association, as shown in the following tabulation of correlation coefficients between percent changes in employment of specific types of hospitals and percent changes in total payroll employment over the 1990-to-2004 period:

	<i>Correlation coefficient</i>
Private-sector hospitals:	
General and surgical	-0.80
Mental and drug abuse	-.82
Other specialty	-.92
Public-sector hospitals:	
Federal	-.40
State	-.54
Local	-.67

Clearly, the private-sector categories of hospitals uniformly exhibit stronger relationships with the movements of total employment than do the public-sector categories of hospitals.

Aside from exhibiting countercyclical patterns, the various categories of hospitals show substantial contrast in their

Chart 6. Year-to-year percent changes in all hospital employment and in total government hospital expenditures, deflated by the Producer Price Index for hospitals, 1991–2003



NOTE: Correlation coefficient = 24.

overall, long-term direction and degree of change in jobs. Private specialty hospitals other than behavioral (cancer hospitals, for example) grew proportionately the most, by 64 percent, from 1990 to 2005. Private general and surgical hospitals exhibited the second-greatest percent in employment growth, 24 percent. Private behavioral hospitals and State hospitals, which also are mental facilities to a large extent, declined quite similarly to each other, by about 20 percent, while other venues for psychological treatment (offices of psychiatrists, offices of other mental health practitioners, outpatient mental health centers, and residential mental and substance abuse care facilities) increased substantially in employment. Numbers of jobs in Federal and local government hospitals remained relatively stable, increasing by no more than 8 percent. The growth of employment in hospitals, then, was concentrated in private facilities for the treatment of physical illnesses and injuries.

THE TRENDS OF EMPLOYMENT IN HOSPITALS are atypical in comparison to those in other industries. Hospital jobs are more than resistant to recessions; the changes in hospital employment are countercyclical. The clearest statistical relationship found with employment in all hospitals is the inverse relation between the growth rate of hospital employment and that of total payroll employment. The waning and waxing of the available labor supply appears to be an important cyclical influence on hospital staffing levels. Government policy also affects employment in hospitals, because changes in funding are substantial and government funding makes up a large percentage of hospital income. Progress in medical technology both increases and decreases demand for hospital services. Trends in population by age increase the need for hospital services, while competition from outpatient venues reduces demand. Growth in hospital outpatient business increases demand for hospital personnel. In sum, a wealth of unusual influences contributes to an unusual pattern of employment in hospitals. □

Notes

¹ Employment data presented in this article are from the Current Employment Statistics (CES) program, which conducts monthly surveys of about 160,000 businesses and government agencies representing 400,000 establishments. For more information on the CES program's concepts and methodology, see *BLS Handbook of Methods*, chapter 2, on the Internet at www.bls.gov/opub/hom/homch2_a.htm. CES data are available on the Internet at www.bls.gov/ces/.

² The industry code for hospitals in the North American Industry Classification System (NAICS) is 622. For industry definitions, see www.census.gov/epcd/www/naics.html. In the CES program, statistics for private, Federal, State, and local government hospitals are estimated separately. These four series were added together to form one time series for purposes of this article.

³ Frank Hobbs and Nicole Stoops, *Demographic Trends in the 20th Century*, Census 2000 Special Reports, Series CENSR-4 (U.S. Census Bureau, 2002), pp. 57–59.

⁴ *Statistical Abstract of the United States: 2004–2005* (U.S. Census Bureau, 2005), table 162, p. 113. Most of the data in the tabulation are from *Vital and Health Statistics*, Series 13 (U.S. National Center for Health Statistics, various years); and unpublished data.

⁵ Calculated from resident population estimates from the U.S. Census Bureau.

⁶ See Anthony Birritteri, “New Jersey—The Innovative State, Part XIV: Technology Triumphs: Hospitals Investing in IT See Healthy Rewards,” *New Jersey Business*, June 1, 2004, pp. 42 ff.; and Vince Galloro, “The Edge Centers of attention: Don’t look for back-office personnel at HCA hospitals,” *Modern Healthcare*, July 22, 2002, pp. 26 ff.

⁷ See Amy B. Bernstein, Esther Hing, Abigail J. Moss, Karen F. Allen, A. B. Siller, and R. B. Tiggler, *Health care in America: Trends in utilization* (Hyattsville, MD, National Center for Health Statistics, 2003), p. 7.

⁸ *Ibid.*

⁹ According to the U.S. Food and Drug Administration, “A medical device is: ‘an instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent, or other similar article that is intended for use in the diagnosis of disease or other conditions, or in the care, mitigation, treatment or prevention of disease.’ Medical devices can be anything from thermometers to artificial hearts to at-home pregnancy test kits. Federal Food, Drug and Cosmetic Act, Section 201”; on the Internet at www.fda.gov/cdrh/consumer/product.html (visited Dec. 16, 2004).

¹⁰ Information on numbers of approvals of such medical devices is found in the FDA’s *ODE/OVD Annual Reports* for fiscal years 1990 through 2003.

¹¹ “Significant,” “breakthrough,” and “important” device approvals were tried separately as sole independent variables and in a model using percent change in total payroll employment as an additional independent variable. In both cases, results for approvals were far from statistically significant.

¹² Telephone interview with Dee Roth, chief, Program Evaluation and Research, Ohio Department of Mental Health, Jan. 26, 2004.

¹³ According to the American Hospital Association’s Diana Cobertson, reached by phone on May 5, 2005, 221 of the 336 State-controlled hospitals treat behavioral problems only. These 221 hospitals include 192 psychiatric hospitals, 12 child psychiatric hospitals, 12 institutions for the retarded, and 5 facilities for the treatment of alcohol and drug problems.

¹⁴ “AIDSinfo: Approved Medications to Treat HIV Infection” (U.S. Department of Health and Human Services, reviewed May 2005), on the Internet at aidsinfo.nih.gov/other/cbrochure/english/05_en.html (visited Feb. 3, 2005).

¹⁵ “Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents” (Department of Health and Human Services, Panel on Clinical Practices for Treatment of HIV Infection, Oct. 29, 2004), p. 2.

¹⁶ Tom W. Smith, *American Sexual Behavior: Trends, Socio-Demographic Differences, and Risk Behavior* (University of Chicago, National Opinion Research Center, April 2003, updated in December

1988); on the Internet at cloud9.norc.uchicago.edu/dlib/t-25.htm (visited Feb. 3, 2005).

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¹⁹ Hospital expenditure figures are provided by M. Kent Clemens, actuary, Center for Medicare and Medicaid Services, U.S. Department of Health and Human Services.

²⁰ James C. Robinson, "Renewed Emphasis On Consumer Cost Sharing In Health Insurance Benefit Design," *HEALTH AFFAIRS—Web Exclusive*, Mar. 20, 2002, p. W143.

²¹ *Ibid.*

²² Calculated from HMO enrollment figures in *Statistical Abstract of the United States: 2004–2005* (U.S. Census Bureau, 2004), table 137, and population figures in Census Bureau Historical Health Insurance Table HI-1; on the Internet at www.census.gov/prod/2004pubs/04statab/health.pdf (visited Feb. 3, 2004).

²³ Robinson, "Renewed Emphasis On Consumer Cost Sharing," p. W143.

²⁴ See, for example, Judith Messina, "Hospitals won't take scalpel to clinical units: Fearful of competition; can mergers still pay off?" *Crains New York Business*, Apr. 24, 2000; and Scott Hensley, "Survey Shows More Hospitals Turning to Outside Firms for a Broad Range of Services," *Modern Healthcare*, Jan. 13, 1997, pp. 45 ff.

²⁵ See, for example, PricewaterhouseCoopers, "Cost of Caring: Key Drivers of Growth of Spending on Hospital Care," Feb. 19, 2003, p. 6, on the Internet at www.healthcare.pwc.com/cgi-local/hcregister.cgi?link=pdf/caring.pdf (visited May 24, 2006).

²⁶ Bernstein and others, *Health Care in America*, p. 6.

²⁷ *Ibid.*

²⁸ *Vital and Health Statistics*, Series 13.

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³³ Christopher J. Ruhm, "Are Recessions Good for your Health?" *Quarterly Journal of Economics*, May 2000, pp. 617–50.

³⁴ John Schwartz, "Always on the Job, Employees Pay with Health," *The New York Times*, Sept. 5, 2004, pp. A1 ff., also on the Internet at www.nytimes.com/2004/09/05/health/05stress.html?pagewanted=2&ei=5090&en=4f3737967aa1ae66&ex=1252123200&partner=rssuserland.

³⁵ Ruhm, "Are Recessions Good for your Health?"

³⁶ Data on ambulatory visits are from the National Center for Health Statistics' National Hospital Ambulatory Medical Care Survey. Annual data for the years 1994 to 2002 were used.

³⁷ The BLS Job Openings and Labor Turnover program supplies statistics on job openings only at much higher levels of industry detail than hospitals.

³⁸ According to Janet Heinrich, "National data are not adequate to describe the full nature and extent of nurse workforce shortages" ("NURSING WORKFORCE Multiple Factors Create Nurse Recruitment and Retention Problems," GAO Testimony GAO-01-912t, June 27, 2001, p. 3).

³⁹ Judith VandeWater, "Hospital Care Could Suffer from Labor Shortage," *St. Louis Post-Dispatch*, August 18, 2002, pp. E1 ff.; and Tammie Smith, "Hospitals Turn to Agencies; Nurses Not Only Jobs They're Hurting to Fill," *Richmond Times-Dispatch*, Jan. 1, 2002, pp. B1 ff.

⁴⁰ VandeWater, "Hospital Care Could Suffer."

⁴¹ Lisa Richardson, "The State Intense Debate at Hearing Tackles Issue of Nurses Staffing at Hospitals," *Los Angeles Times*, Nov. 16, 2002, pp. B10 ff.

⁴² After 2002, estimates are not consistent with earlier ones, because the Standard Industry Classification System was replaced with the North American Industry Classification System.

⁴³ This specific unemployment rate is that of people whose latest job was in the hospital industry.

⁴⁴ A *t*-score of -7.4 indicates that the correlation is statistically significant at a 0.2-percent level of probability.

⁴⁵ Data on gross job gains are from the BLS Business Employment Dynamics program, which produces and maintains a quarterly series of statistics on gross job gains and gross job losses in the private sector. Gross job gains and gross job losses reveal some aspects of business dynamics, including establishment openings and closings and establishment expansions and contractions. The microdata used to construct the statistics on gross job gains and gross job losses are from the Quarterly Census of Employment and Wages (QCEW), or ES-202, program.

⁴⁶ The stated shares are calculated from Current Population Survey data. The Current Population Survey is conducted by the Bureau of the Census and disseminated by the Bureau of Labor Statistics.

⁴⁷ "Troubling Labor Shortage Health-Care Vacancies Stress Industry in Maine," *Portland Press Herald*, Sept. 5, 2001, pp. 1B ff.

⁴⁸ These 13 industry aggregations are natural resources and mining, construction, manufacturing, wholesale trade, retail trade, transportation and warehousing, utilities, information, financial activities, professional and business services, education and health services, leisure and hospitality, and other services.

⁴⁹ Statistics representing government expenditures on hospital services were provided by Matthew Clemens, Center for Medicare and Medicaid Services, U.S. Department of Health and Human Services.

⁵⁰ “Key Milestones in CMS Programs” (Centers for Medicare & Medicaid Services), on the Internet at www.cms.hhs.gov/about/history/milestones.asp (visited Nov. 4, 2004).

⁵¹ “DSH [Disproportionate Share Hospital] payments are additional payments in the Medicaid and Medicare programs that . . . help hospitals finance care to low-income and uninsured patients,” according to the National Association of Public Hospitals and Health Systems, “NAPH Issue Brief,” February 2001, located on the Internet at www.naph.org/content/Navigationmenu/About_Our_Members/

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