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Hospital Employment Trends In California, 1982-1994
by Gerard F. Anderson and Linda T. Kohn

Abstract: During the 1980s California hospitals responded to selective contracting, growth in managed care, and the Medicare prospective payment system (PPS) by controlling their level of spending. This DataWatch examines whether these hospitals achieved these savings by changing the number and/or the mix of hospital employees. We examined employment trends because wages represent the largest component of hospital budgets and because the number and mix of personnel can be changed in the short run. Analysis of the California Health Facilities Cost Report data shows that employment increased steadily during 1982-1994. There is no evidence that hospitals responded to growing competition by altering the rate of growth in hospital personnel and only weak evidence that they altered the mix of personnel by hiring a greater proportion of nonclinical staff. We conclude that increased competition had only a minor effect on hospital employment decisions.

The growth of managed care and selective contracting in the 1980s, as well as the Medicare prospective payment system (PPS), placed financial pressures on all hospitals in California to control costs. Research has suggested that price competition in California has resulted in reduced spending growth and improved hospital efficiency, particularly for hospital inpatient use and spending.\(^1\) Competitive markets in California were found to have experienced reduced growth in hospital spending in the range of 9-13 percent below the growth rate in noncompetitive areas.\(^2\) A number of hypotheses have been suggested to explain these results. One is that hospitals with many neighboring hospitals face a real threat of having patients diverted to other providers, and, therefore, they lower their prices.\(^3\) Another hypothesis is that increased competition reduces the volume of services delivered by hospitals in California.\(^4\)

California appears to be a good location in which to test hypotheses concerning what will happen as health care competition increases. In this DataWatch we examine one aspect of this: employment trends. Labor represents almost 80 percent of hospital spending.\(^5\) Thus, hospitals would be expected to constrain their labor expenditures as a means of containing costs. It is also logical to assume that labor would be especially sensitive to

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price competition, since many personnel-related decisions are under managerial discretion and can be reduced in the short run, unlike capital expenditures, which are fixed for longer periods of time. Hospitals may develop contractual arrangements, substitute lower-cost personnel, or collapse departments and functions to use labor resources more efficiently. Anecdotal evidence suggests that hospitals in California have responded to price competition with a greater commitment to cutting labor costs, at least in part through layoffs, tight budget controls, and reconsideration of staff roles and tasks. Our first hypothesis, therefore, is that hospitals facing greater competition will show lower rates of growth in hospital personnel.

We also examine the impact of competition on specific categories of hospital personnel. Not all types of hospital labor are interchangeable, so different employment trends may reflect different hospital priorities. Some personnel are directly involved in providing patient care, while other personnel focus on maintaining the institution itself. Our second hypothesis is that a greater proportion of nonclinical personnel will be hired in more competitive areas to respond to increased marketing, financial, and other requirements associated with operating in a competitive environment.

**Methods.** This study examines employment trends in 326 short-term general hospitals in California from 1982 to 1994. All hospitals in California are required to submit cost reports annually to the California Office of Statewide Health Planning and Development (OSHPD). This data set represents the universe of short-term general hospitals in California for which complete information was available beginning with fiscal year 1982 and ending with fiscal year 1994.

The California cost reports are more detailed than the Medicare Cost Reports in a number of ways, including employment information. Information on employment by cost center (radiology, food services, and so on) and by occupation (nursing, clerical, and so on) is available and can be cross-referenced. Hospitals are required to report the number of personnel hours for each cost center, by the following ten occupational categories: managers and supervisors; technicians and specialists; registered nurses; licensed vocational nurses; aides and orderlies; clerical and other administrative staff; environmental and food services staff; physicians; nonphysician medical practitioners; and other. When cost and occupational information are combined, full-time-equivalent (FTE) personnel can be calculated by function. For example, the number of management and supervisory personnel can be identified within each cost center. This permits a clearer differentiation of roles—for example, supervisory versus nonsupervisory nurses—than is available from most other sources. These data then can be aggregated across cost centers to obtain total managerial and supervisory personnel within an organization.
We used this information to create five employment categories. First, we divided personnel into clinical and nonclinical categories. Then we divided the clinical and nonclinical categories into subgroups based upon job classification. The five general labor categories we selected are nurses, physicians/professionals/technicians, and patient care support (in the clinical personnel group); and general administration and general hospital support (in the nonclinical personnel group). Personnel in each cost center and occupational category were placed within one of these five labor categories. Within a single cost center, some personnel may have been placed in one of the clinical categories, and other personnel may have been placed in one of the nonclinical categories. For example, clerical and administrative support personnel within ancillary services were considered to be part of patient care support, clinical personnel. Management and supervisory personnel within ancillary services were considered to be part of general administration, nonclinical personnel.\textsuperscript{7}

We obtained from the Health Care Financing Administration (HCFA) the Medicare Case-Mix Indices for each hospital in California for each year from 1982 to 1994 and merged these data into the California data set. We obtained from InterStudy the health maintenance organization (HMO) penetration rate for each metropolitan statistical area (MSA) in California for each year from 1982 to 1994. All of the hospitals in each MSA were assigned the same HMO penetration rate; all of the hospitals located in rural areas were given the statewide average penetration rate. HMO enrollment is based on the location of the plan’s headquarters, as reported to InterStudy. As a result, HMO percentages may be overestimated to the extent that a plan’s enrollees live in an MSA that is different from that of the plan’s headquarters.

\textbf{Results}

Examination of data from the 326 California hospitals shows that the number of FTE personnel per thousand inpatient days increased 40 percent during 1982-1994 (Exhibit 1). There were increases in all labor categories, with the largest increase occurring in general administration (116 percent). Examination of the data year by year (not presented) shows that the ratio of clinical to nonclinical personnel increased in the 1982-1985 period and began to decline thereafter. Over the entire twelve-year period, the number of nonclinical personnel increased more than twice as fast as did the number of clinical personnel.

During this time period the complexity of patients’ illnesses gradually increased. To standardize for changes in case-mix, we used the Medicare case-mix index as a proxy for the change in the case-mix of all patients seen
Exhibit 1
Ratio Of Full-Time-Equivalent Hospital Personnel Per Thousand Inpatient Days In California, Unadjusted And Adjusted For Case-Mix, 1982-1994

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total personnel</td>
<td>10.53</td>
<td>14.75</td>
<td>40%</td>
<td>9.14</td>
<td>10.22</td>
<td>12%</td>
</tr>
<tr>
<td>Nonclinical personnel</td>
<td>3.59</td>
<td>5.79</td>
<td>61</td>
<td>3.12</td>
<td>4.01</td>
<td>28</td>
</tr>
<tr>
<td>Nurses</td>
<td>4.09</td>
<td>5.24</td>
<td>28</td>
<td>3.55</td>
<td>3.63</td>
<td>2</td>
</tr>
<tr>
<td>Physicians/professionals/technicians</td>
<td>1.63</td>
<td>2.38</td>
<td>46</td>
<td>1.41</td>
<td>1.65</td>
<td>16</td>
</tr>
<tr>
<td>Patient care support</td>
<td>1.19</td>
<td>1.33</td>
<td>12</td>
<td>1.03</td>
<td>0.92</td>
<td>-10</td>
</tr>
<tr>
<td>General administration</td>
<td>1.84</td>
<td>3.98</td>
<td>116</td>
<td>1.60</td>
<td>2.75</td>
<td>72</td>
</tr>
<tr>
<td>General hospital support</td>
<td>1.75</td>
<td>1.82</td>
<td>4</td>
<td>1.52</td>
<td>1.26</td>
<td>-17</td>
</tr>
</tbody>
</table>

Source: Data from the California Office of Statewide Health Planning and Development and the Health Care Financing Administration.

by California hospitals. After adjusting for case-mix changes, the number of FTEs per thousand inpatient days declined in patient care support and general hospital support. Growth was largest in general administration, suggesting a change in hospital priorities. In 1982, for example, there were almost four clinical employees for every general administration employee; by 1994 the ratio was only slightly above two to one. After adjusting all labor categories for changes in case-mix, the number of clinical personnel per thousand inpatient days increased by only 3 percent, compared with a 28 percent increase in nonclinical personnel.

We examined subsets of California hospitals to determine if employment trends differed by competitive environments. The results show that the rate of growth in the number of FTEs per thousand inpatient days adjusted for case-mix during 1982-1994 in the thirty-seven rural hospitals was more than twice that in the 289 urban hospitals (Exhibit 2). Increases in the numbers of both clinical and nonclinical personnel were more rapid in rural hospitals; by 1994 rural hospitals employed more clinical and nonclinical personnel per patient day, adjusted for case-mix, than did the urban hospitals. Hospitals with more hospital neighbors were likely to show slower rates of growth in personnel. The differences in growth rates were especially large for clinical personnel. The 123 hospitals located in MSAs with HMO penetration of 20 percent or less in 1994 had slower rates of growth in clinical personnel than did the 203 hospitals located in MSAs with HMO penetration of more than 20 percent.
### Exhibit 2
Full-Time-Equivalent Hospital Personnel Per Thousand Inpatient Days, Comparison Of Mean Values By Area Characteristics, Adjusted For Case-Mix, 1982-1994

<table>
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<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural hospitals</td>
<td>11.19*</td>
<td>24.21%*</td>
<td>6.49*</td>
<td>13.26%*</td>
<td>4.69*</td>
<td>43.51%*</td>
</tr>
<tr>
<td>Fewer than three</td>
<td>10.66*</td>
<td>27.06%*</td>
<td>6.52*</td>
<td>19.05*</td>
<td>4.15*</td>
<td>42.86%*</td>
</tr>
<tr>
<td>hospital neighbors</td>
<td>10.35*</td>
<td>20.54%*</td>
<td>6.33*</td>
<td>11.02*</td>
<td>4.02*</td>
<td>40.64%*</td>
</tr>
<tr>
<td>3-9 hospital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>neighbors</td>
<td>10.09*</td>
<td>7.12%*</td>
<td>6.10*</td>
<td>-1.02%</td>
<td>3.99*</td>
<td>23.40%*</td>
</tr>
<tr>
<td>10 or more hospital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>neighbors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMO penetration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 percent or less</td>
<td>9.86*</td>
<td>15.30</td>
<td>6.07*</td>
<td>8.68</td>
<td>3.78*</td>
<td>29.42</td>
</tr>
<tr>
<td>More than 20 percent</td>
<td>10.35*</td>
<td>10.76</td>
<td>6.25*</td>
<td>1.82</td>
<td>4.10*</td>
<td>28.61</td>
</tr>
</tbody>
</table>

Source: Data from the American Hospital Association and InterStudy.
Note: HMO is health maintenance organization.
* p < .05.

### Discussion

**Growth in number of personnel.** We reject our first hypothesis that hospitals in California that face greater competition show slower rates of growth in hospital personnel. Our study provides little evidence that hospitals responded to changing incentives by reducing the number of hospital employees. The total number of employees increased steadily during this period, with most of the growth occurring in the nonclinical personnel categories, especially general administration. Hospitals experiencing greater competition, as measured by the number of competitors within fifteen miles of the hospital, exhibited only slightly slower rates of increase in the number of hospital personnel they employed during this period, while hospitals located in areas of greater HMO penetration had slightly slower rates of growth.

**Changes in mix of personnel.** We can neither reject nor accept the second hypothesis, that competition influences the mix of personnel that hospitals employ. During this period there were larger employment increases in the nonclinical personnel categories than in the clinical categories. Increases were largest in general administration, while they were small or even negative in nursing, patient care support, and general hospital support. These changes in personnel mix could have been in response to competitive pressures. Hospitals with more neighbors and higher HMO
penetration had less growth in clinical personnel than did hospitals with fewer neighbors and less HMO penetration. Hospitals with more than ten neighbors had slower growth in nonclinical personnel than did hospitals with nine or fewer neighbors. The level of HMO penetration did not appear to influence the rate of hiring nonclinical personnel. All of this suggests that the mix of personnel is influenced by the level of competition in the marketplace. However, other data could lead to a different conclusion. The ratio of clinical to nonclinical personnel in competitive and noncompetitive areas was similar in 1994. Multivariate analysis (not presented) shows that the number of neighbors and the level of HMO penetration have a minor impact on the personnel ratios.

Caveats. These results must be interpreted with caution because of data constraints. The results are based on hospitals in only one state; thus, generalizations to other states or to other competitive environments are not necessarily appropriate. The California data are self-reported, so the reports from specific hospitals could be problematic. Also, the groupings of personnel into labor categories could have been done in other ways that could influence the results.

The calculations were based only on FTEs per inpatient day, although all personnel (inpatient and outpatient) are counted. Growth of outpatient volume certainly could account for some of the growth in personnel and suggests that the number of clinical personnel per unit of output actually declined. As a result, productivity in the clinical areas may have actually increased. This contrasts with previous research that found no productivity gains in overall personnel. It also emphasizes the need to examine specific categories of labor, not just total personnel, to identify shifts in the use of hospital labor over time.

Some of the independent variables in our multivariate analysis, which is not reported here, could have been measured differently. For example, the Medicare case-mix index may be a poor proxy for overall case-mix in some hospitals. HMO penetration and number of neighboring hospitals may not be good measures of the level of competition faced by hospitals. An alternative measure may produce different results. The Herfindahl Index has been used extensively in the literature on hospital markets, but similar results have been found when using the more understandable variable measure of the number of neighboring hospitals.

A change in reporting requirements was instituted in 1986; however, it did not affect the reporting of personnel. The OSHPD cannot attribute the increase in personnel from 1985 to 1986 to a change in reporting requirements, based on our conversations with OSHPD staff. Also, the rapid increase continues into subsequent years, so the results are stable from 1986 onward and are not the function of a reporting change in a single year.
Concluding comments. Employment in the hospital industry in California increased steadily between 1982 and 1994 (except for modest declines in 1987 and 1988), despite numerous health care financing reforms. There is no evidence that hospitals responded to the increasing levels of competition by hiring fewer hospital personnel, and some weak evidence that they altered the mix of personnel by hiring more nonclinical personnel. We conclude, therefore, that competition had only a minor effect on hospital employment in California during 1982-1994.

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NOTES

7. For a complete listing of cost center and occupational code groupings, contact the authors at The Johns Hopkins University, Center for Hospital Finance and Management, Third Floor, 624 North Broadway, Baltimore, Maryland 21205.