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ARE HEALTH WORKERS UNDERPAID?

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ARE HEALTH WORKERS UNDERPAID?

Introduction

For many decades the "underpaid" health worker was a commonplace figure in most discussions of the health industry. Not the physician, of course, but other health workers, such as nurses, technicians, and clerical and service employees, were said to be poorly paid relative to similar workers in other industries. With few exceptions the allegations about relative wage levels were rarely supported by systematic theoretical or empirical analysis.¹ Given the paucity of data about earnings in health, this was not surprising. Nor was it surprising that initial attention focused primarily on the earnings of physicians, who were allegedly in a dominant monopoly position.²

Several recent developments suggest the desirability of a closer examination of the wages of allied health personnel. First, there is the sheer size of the industry. Employment in health, excluding physicians, dentists, and other highly trained professionals, now amounts to over four million, approximately two-thirds of whom are employed in hospitals. Second, there is the problem of the rapid escalation of hospital costs, which have been growing by more than 10 percent per annum for the past decade. Hospitals, like other service industries, are highly labor intensive, with payrolls accounting for about 60 percent of total expenses. Finally, note should be taken of increasing union activity in hospitals as well as the tendency for professional associations to press vigorously for higher wages.

There is a clear need for a firm statistical base describing the levels and rates of change of wages for various types of manpower in hospitals and other health settings, and for analytical studies designed to explain the causes and consequences of wage variation in the health industry. This paper is intended to fill the first need, and provide data for the second. With the rich detail provided in the public use samples of the 1960 and 1970 Censuses of Population, it is possible to calculate hourly earnings rates for all allied health personnel classified by occupation, sex, schooling, geographical location, and many other characteristics. Furthermore, it is possible to compare these earnings with those of workers with similar characteristics in other nonfarm industries. This descriptive paper will be followed by others which attempt to explain cross-sectional variations in levels and rates of change of earnings and to analyze the industry's response to these variations.

The next section describes the data and methods used in this paper. It is followed by sections reporting the results for 1969 and the changes from 1959 to 1969; then a section that concentrates on regional differentials; and finally a brief section on changes since 1969. Some of the questions addressed in this paper are: How do wages in health compare with wages in other industries? Did wages rise more rapidly in health than in other industries in the 1960's? Was this a "catching-up"? How do wage levels and rates of change vary among different health occupations and settings? How do they vary by region?

Data and Methods

This study covers all wage and salary workers with less than 18 years of schooling employed in the Census week, 1970 (or 1960) who had earnings in 1969 (or 1959). Wage and salary workers with 18 or more years of schooling and all self-employed workers are excluded in order to concentrate on the so-called allied health personnel. Data for the health industry are obtained from the 1/100 samples of the Censuses, which yield 34,489 observations in 1970 and 19,288 in 1960. Data for all nonfarm industries are obtained from the 1/1000 samples, which yield 61,584 and 50,349 observations, respectively.

Workers are initially classified by sex, color (white and non-white), age (14-19, 20-24, 25-34, 35-44, 45-54, 55-64, and 65+), and years of schooling (\leq 8, 9-11, 12, 13-15, 16, 17). Average hourly earnings for each sex-color-age-schooling cell are calculated by dividing reported total annual earnings in 1969 by an estimate of the total annual hours worked in 1969. Annual hours for each worker are estimated by multiplying the number of weeks worked in 1969 by the number of hours worked in the Census reference week in 1970. It is important to estimate hours for each worker individually and then sum across all workers in a cell (rather than multiply the means of weeks worked and hours per week) because there is a positive correlation between weeks per year and hours per week across workers.

With this approach workers can be grouped by industry, occupation, region or other variables, and their hourly earnings can be compared to the national norm (defined as all nonfarm industries) in the following way: an "expected" hourly earnings for each industry,

occupation, etc. is calculated by multiplying the hourly earnings rate for all nonfarm industries in each sex-color-age-schooling cell by the total annual hours worked in each cell in the particular industry, occupation, etc., and dividing by the total annual hours for all cells. That is,

$$\text{Expected hourly earnings} = \frac{\sum_c W_{c\bullet} H_{ci}}{\sum_c H_{ci}}$$

where $W_{c\bullet}$ = average hourly earnings in U.S. nonfarm industries of wage and salary workers in cell c and H_{ci} = total hours worked in industry or occupation i by workers in cell c . The ratio of actual to expected earnings provides a wage index for i standardized for sex, color, age, and schooling.

While I believe these data and methods provide a richer picture of the earnings of allied health manpower than is available from any other source, there are clearly shortcomings and possible biases which should be noted. First, the method of estimating annual hours, using the weeks worked in 1969 (or 1959) and the hours worked in the Census week in 1970 (or 1960), is appropriate only if the hours worked in the Census week are a good approximation of average weekly hours in the preceding year. For individual workers this will frequently not be the case, but for large groups of workers individual differences tend to cancel out.³ As a general rule of thumb, little confidence should be placed in estimates based on fewer than 50 workers, and no such estimates are presented. Indeed, any estimates based on fewer than 100 workers will be clearly identified.

Second, it should be noted that the average earnings calculated is not a simple average of the hourly earnings of each worker, but it is a weighted average where the weights are the annual hours of each worker. I believe the weighted average is preferable for most purposes. It tells us, for instance, what was the average wage paid for an hour of nurses' services rather than the wage rate of the average nurse. The former is likely to be estimated with greater accuracy because the hourly earnings of those workers with very low annual hours are probably estimated with considerable error. There are some applications, however, such as estimation of supply functions, where the unweighted average might be preferable.

Another problem concerns the omission of fringe benefits from the earnings estimates. The ratio of fringes to direct wages may vary from occupation to occupation, or from region to region. To the extent that it does, the hourly earnings data are an imperfect estimate of labor costs to the employer or labor compensation to the employee.

A fourth problem is that my method of calculation necessarily omits persons who were employed in the year prior to the Census but not employed during the Census week.⁴ Such persons who are, on average, less continuously employed may well have lower than average hourly earnings. If it were possible to include them in the estimates of hourly earnings, it is possible that the overall average might be reduced by a few percent,⁵ but I doubt whether the comparisons over time and space would be much affected.

Finally, it should be noted that when the wages of the workers in one industry are shown relative to the wages of workers in all

industries (i.e., actual ÷ expected) a problem arises if the industry in question accounts for a significant fraction of the all-industry total. In such cases the ratio of wages in the industry to all other industries could be significantly different from the ratio to all industries.⁶

Results, 1969

We begin with a comparison between the Health Industry as a whole and all nonfarm industries, shown in Table 1. We note that overall annual earnings and hourly earnings are substantially lower in Health, but most of this differential disappears if comparisons are made within color-sex categories. Approximately 80 percent of the labor hours of allied health personnel are worked by females, compared with 35 percent for the All Industries reference group. The last row of Table 1 shows actual earnings divided by expected, i.e. the standardized wage index. The value of .95 for All indicates that wages in Health, adjusted for sex, color, age and schooling, were 5 percent below the All Industry norm in 1969. This differential was entirely attributable to the relatively low earnings of males in Health; female earnings were almost exactly at the All Industry level.⁷ It should be noted that females in Health work more hours per year than females in other industries, whereas the reverse is true for males. This is probably related to the sex difference in the standardized wage index.

In Table 2 we begin to disaggregate the Health Industry, first into workers in Hospitals and those in Other Health settings, and then for white females by years of schooling. One striking result is the

Table 1. Earnings and hours of wage and salary workers^{a/} in the Health Industry and All Industries,^{b/} 1969.

Category	All	White males	White females	Non-white males	Non-white females
<u>Annual earnings (U.S.\$)</u>					
Health	4492	6498	4136	4956	4031
All Industries	6294	8157	3954	5592	3444
<u>Annual hours</u>					
Health	1632	1837	1559	1841	1741
All Industries	1769	1956	1495	1845	1554
<u>Hourly earnings (U.S.\$)</u>					
Health	2.75	3.54	2.65	2.69	2.32
All Industries	3.56	4.17	2.64	3.03	2.22
<u>Expected hourly earnings^{c/}</u>					
Health	2.89	4.20	2.69	3.10	2.28
<u>Hourly earnings ÷ expected hourly earnings</u>					
Health	.95	.84	.99	.87	1.02

^{a/} All data refer to wage and salary workers with 17 years of schooling or less.

^{b/} "All Industries" always excludes agriculture, forestry, and fisheries.

^{c/} The earnings we would observe in Health if each worker were paid at the "All Industries" rate for given color, age, sex, and schooling.

Source: The 1/1000 (for All Industries) and 1/100 (for Health) samples of the Census of Population. Calculations by the author. All ratios calculated from unrounded data.

Table 2. Average hourly earnings in Hospitals and Other Health, actual and relative to All Industries, 1969.

Category	Actual		Expected		Actual + expected	
	Hospital	Other Health	Hospital	Other Health	Hospital	Other Health
All	2.81	2.60	2.91	2.85	.97	.91
White males	3.45	3.81	4.13	4.40	.84	.87
White females	2.75	2.46	2.70	2.66	1.02	.92
Non-white males	2.70	2.65	3.08	3.18	.88	.83
Non-white females	2.37	2.12	2.29	2.23	1.04	.95
<u>White females</u>						
Years of schooling:						
≤ 8	1.99	1.75	2.08	2.07	.96	.85
9-11	2.19	1.94	2.32	2.30	.94	.85
12	2.61	2.36	2.58	2.57	1.01	.92
13-15	3.17	2.85	2.86	2.87	1.11	.99
16	3.70	3.59	3.84	3.91	.96	.92
17	3.90	4.32	4.63	4.66	.84	.93

substantially higher earnings in Hospitals, especially for females. Both white and non-white females in Hospitals make about 10 percent more per hour than do females with similar age and schooling in other parts of the Health Industry, such as physicians' offices and nursing homes. Another striking result is the variation in the standardized wage index by years of schooling. Females with 12 or 13-15 years of schooling do particularly well in Health.

Table 3 disaggregates by occupation and again some interesting differences within the Health Industry emerge. Several non-health occupations are also presented to sharpen the comparisons. Among the professional allied health personnel, registered nurses stand out with a wage index 19 percent above the All Industry norm. By contrast, dietitians in Health make 13 percent less than expected, given their age and schooling. Secretaries and other clerical workers in Health have slightly higher expected earnings than their counterparts in other industries, but their actual earnings are about 10 percent lower. In the service group of occupations, practical nurses do surprisingly well, with hourly earnings almost equal to expected. The other service occupations in Health and other industries, have rather low earnings, both absolutely and relative to expected.

The two major male occupations show interesting and consistent comparisons between Health and other industries. In both cases, the expected earnings (reflecting the age-schooling mix) is somewhat higher in Health, but actual earnings are lower, yielding a standardized wage index 12 percent under the norm. One possible explanation, not explored in this paper, is that males in these occupations in other industries tend to be heavily unionized, but are much less so in Health.

Table 3. Hourly earnings in selected occupations, Health and other industries, 1969.

Category	Hourly earnings (\$)		Actual ÷ expected
	Actual	Expected	
<u>White females</u>			
Dietitians	2.79	3.20	.87
Registered nurses	3.53	2.96	1.19
Health technologists and technicians	3.07	2.88	1.07
Teachers, exc. college and university	4.32	3.95	1.09
Social & rec. workers, exc. health	3.29	3.49	.94
Librarians	3.84	3.93	.98
Secretaries--health	2.57	2.70	.95
Other clerical--health	2.37	2.62	.90
Secretaries--except health	2.81	2.67	1.05
Other clerical--except health	2.60	2.58	1.01
Practical nurses	2.49	2.57	.97
Nursing aides, orderlies, etc.	1.88	2.41	.78
Other service workers--health	2.03	2.42	.84
Hairdressers and cosmetologists	2.15	2.41	.89
Other service workers--except health	1.83	2.38	.77
Private household workers	1.39	2.27	.61
<u>White males</u>			
Health technologists and technicians	3.86	4.37	.88
Craftsmen and operatives--health	3.59	4.06	.88
Engineering and science technicians	4.30	4.24	1.01
Craftsmen and operatives--except health	3.87	3.86	1.00

In Table 4 we disaggregate simultaneously by occupation and health setting. For some occupations, notably secretaries and other clerical, the setting is irrelevant; the standardized wage indexes are almost identical. Standardized earnings tend to be appreciably higher in hospitals for registered and practical nurses and nurses' aides, but not for technologists and technicians. Whether these differentials were also present in 1959 or emerged only during the course of the decade is one of the questions to be examined in the next section.

Results: Changes from 1959 to 1969

The ten years from 1959 to 1969 were very eventful ones for the health industry. During the first half of the decade, prices and expenditures were rising at a rapid pace, primarily as the result of the development of more complex technology. After 1965 the pace accelerated appreciably under the double impact of massive federal health insurance programs and general economy-wide inflation. This decade also witnessed the beginnings of militant union activity in hospitals, although the fraction of hospital workers covered by collective bargaining agreements in 1969 was still small compared with most industries.

Comparison of the standardized wage indexes in 1959 and 1969 reveals that wages of allied health manpower rose faster than wages in other industries, but the pace of increase was very uneven for different groups within the Health Industry. The first row of Table 5 shows that health workers were indeed poorly paid in 1959 relative to workers in other industries; the standardized wage index was .86. The increase to .95 by 1969 means that earnings in health relative to other industries

Table 4. Hourly earnings relative to expected earnings, white females by occupation and detailed Health Industry, 1969.

Category	Hospitals	Physicians' offices	Nursing homes	Miscellaneous Health ^{b/}
Registered nurses	1.24	1.03	1.02	1.13
Practical nurses	.99	.87 ^{c/}	.88	1.00 ^{c/}
Nursing aides, etc.	.82	<u>a/</u>	.70	<u>a/</u>
Technologists and technicians	1.01	1.05	<u>a/</u>	1.37
Secretaries	.95	.96	.96 ^{c/}	.95
Other clerical	.91	.89	.88	.90

^{a/} Fewer than 50 observations.

^{b/} Dentists' offices, public health agencies, etc.

^{c/} Fewer than 100 observations.

Table 5. Wage indexes in Health, by color and sex, 1959, and changes, 1959 to 1969.

Group	1959		1969 ÷ 1959		
	Actual	Expected	Actual	Expected	Actual ÷ Expected
<u>All Health</u>					
All	.86		1.71	1.55	1.11
White males	.73		1.74	1.51	1.15
White females	.90		1.71	1.56	1.10
Non-white males	.87		1.76	1.77	.99
Non-white females	1.02		1.86	1.87	.99
<u>Hospitals</u>					
All	.86		1.77	1.57	1.12
White males	.72		1.75	1.52	1.16
White females	.90		1.78	1.58	1.13
Government	.97		1.68	1.58	1.07
Private	.87		1.84	1.58	1.16
Non-white males	.87		1.77	1.77	1.00
Non-white females	1.05		1.86	1.89	.99
<u>Other Health</u>					
All	.86		1.59	1.50	1.06
White males	.77		1.66	1.48	1.12
White females	.89		1.58	1.52	1.04
Non-white males	.90		1.62	1.76	.92
Non-white females	.89		1.94	1.82	1.07

rose by 11 percent over the decade. Non-white workers in Health, however, showed no improvement relative to non-white workers in other industries because of the rapid gains made by non-whites in the economy as a whole (reflected in the higher 1969/1959 indexes for expected earnings).

Table 5 also shows that the higher earnings of Hospital workers relative to Other Health workers in 1969 was entirely the result of changes during the decade. In 1959 the standardized wage indexes in the two health sectors were at the same level. Hospital wages rose faster than wages in All Industries by slightly more than one percent per annum. While this differential cumulates to a substantial change in relative wages over a decade (12 percent), it is small relative to the inflation in hospital costs during that same period. The differential rate of change between the Hospital component of the CPI and the total CPI was over 6 percent per annum, 1959-1969. Thus, we see that the "catching-up" of Hospital wages can account for only a small part of the explosion in Hospital prices and expenditures. We also see in Table 5 that the rise in Hospital wages was more rapid in the private sector than in government hospitals.

Changes in the wage indexes by occupation are presented in Table 6. Nurses, both practical and registered, stand out among the Health workers as having experienced very substantial wage gains. Among the non-health occupations, only private household workers show a very large increase in standardized earnings.

It should be noted that every Health occupation improved its relative position between 1959 and 1969, but for nurses' aides, clerical

Table 6. Wage indexes, selected occupations in Health and other industries, 1959 and changes 1959 to 1969.

Occupation	1959	1969 ÷ 1959		
	Actual ÷ Expected	Actual	Expected	Actual ÷ Expected
<u>White females</u>				
Dieticians	.86	1.60	1.58	1.01
Registered nurses	1.01	1.88	1.59	1.18
Health technologists & technicians	1.00	1.66	1.55	1.07
Teachers--ex. college & university	1.14	1.54	1.60	.96
Social and rec. workers--ex. Health	.88	1.57	1.46	1.08
Librarians	.98	1.56	1.57	1.00
Secretaries--Health	.92	1.57	1.51	1.04
Other clerical--Health	.87	1.60	1.55	1.03
Secretaries--except Health	1.11	1.45	1.53	.95
Other clerical--except Health	1.04	1.50	1.55	.97
Practical nurses	.78	1.98	1.59	1.24
Nursing aides, orderlies	.76	1.63	1.58	1.03
Other service workers--Health	.77	1.76	1.61	1.09
Hairdressers, cosmetologists	.90	1.52	1.53	.99
Other service workers--ex. Health	.75	1.60	1.55	1.03
Private household workers	.47	2.04	1.56	1.31
<u>White males</u>				
Health technologists & technicians	.81	1.72	1.58	1.09
Craftsmen and operatives--Health	.76	1.76	1.51	1.16
Engineering & science technicians	1.03	1.53	1.55	.99
Craftsmen & operatives--ex. Health	.99	1.54	1.53	1.01

workers and dieticians, the gains were minimal. The two white male occupations showed substantial gains in wages, but still lagged behind similar workers in other industries.

The final table in this section (Table 7) shows changes by occupation in Hospitals and in the rest of the Health Industry. Again we note a mixed pattern, with some occupations experiencing much larger increases in Hospitals and some showing about the same change in the wage index regardless of setting. The gains made by practical and registered nurses in Hospitals are particularly noteworthy and will be given further scrutiny in the next section.

Regional Differentials in Hospital Wages, 1959 and 1969

One of the advantages of estimating earnings from the public use samples is that it is possible to calculate standardized wage indexes for different geographical areas within the U.S. Information concerning regional differentials in levels and rates of change of wages is of considerable importance for policy purposes such as setting appropriate reimbursement rates for Hospitals. These differentials also provide a basis for analyzing the determinants of wages and the responsiveness of Hospitals to differentials in wage rates.

In Table 8 the standardized wage indexes of white females in the nine Census divisions are presented in 1959 and 1969.⁸ The regional comparisons in this section focus on white females in order to eliminate the possibility that sample variations in sex mix would bias the regional differentials. We know from Table 1 that the standardized wage index for males in Health for the U.S. as a whole is substantially below

The data also indicate very clearly that this equality was achieved since 1959. At that time the standardized wage indexes for both Hospital workers and those in Other Health settings were 14 percent below the All Industry norm. There was a substantial "catching-up" in the 1960's and a persistence of this differential rate of growth, at least for Hospitals, in the 1970's. The earnings of Hospital nurses, both registered and practical, stand out as having experienced the most rapid rates of increase.

Another conclusion of this study is that geographical differentials in Health wages are closely correlated with geographical differentials in all nonfarm wages. If, for instance, we know the national wage index for Hospital workers and the regional wage index for all nonfarm workers, we can predict with considerable accuracy the Hospital wage index in that region. There was, however, some significant variation in the rate of growth of Hospital wages across regions, notably wages in the East rose faster than in the mid- or far-West in the 1960's. The rapid wage gains were accompanied by above average rates of growth in Hospital employment per capita in the Southeast, but by relatively slow growth in the Northeast. The next task is to explain systematically the variations in rates of change of Hospital wages across regions, occupations and Health settings, and to analyze the industry's response to these variations.

Table 8. Standardized wage indexes (actual ÷ expected), white females, Hospitals, Other Health, and All Industries, by Census division, 1959 and 1969.

Region	1959			1969			1969 ÷ 1959		
	Hospitals	Other Health Industries	All Industries	Hospitals	Other Health Industries	All Industries	Hospitals	Other Health Industries	All Industries
New England	.95	.89	1.01	1.13	1.00	1.01	1.18	1.12	1.00
Middle Atlantic	.96	.95	1.11	1.11	1.00	1.12	1.16	1.05	1.01
East North Central	.94	.97	1.07	1.03	.96	1.04	1.10	.99	.97
West North Central	.82	.74	.88	.93	.78	.91	1.13	1.05	1.03
South Atlantic	.81	.82	.93	.98	.93	.94	1.22	1.13	1.01
East South Central	.76	.79	.84	.87	.84	.86	1.15	1.06	1.02
West South Central	.79	.80	.87	.86	.82	.86	1.09	1.02	.99
Mountain	.88	.83	.89	.92	.83	.90	1.04	1.00	1.01
Pacific	1.00	.97	1.07	1.09	.99	1.06	1.09	1.02	.99

that of females. If a region happened, as a matter of chance, to have relatively more males in its sample of Health workers, its standardized wage index for Health would tend to be depressed on that account even though wages for males and females taken separately were no different than in other regions.

One of the most powerful inferences to be drawn from Table 8 is that the geographical differentials in earnings in Hospitals and Other Health settings are very similar to the differentials for all nonfarm industries. The coefficient of rank correlation between the All Industries wage index and the Hospital wage index is .88 in 1959 and .90 in 1969. The All Industry/Other Health coefficients are .90 and .80 respectively. This means that the relative wages of health workers in an area are determined by and large by the same forces that determine the general level of wages in the area, even when there are special factors affecting the national level of wages in Health.⁹ Thus, most of the ad hoc theories about special institutional factors affecting geographical differences in Health wages are probably superfluous.

When we look at the rate of change of wages, however, as reflected in columns 7, 8 and 9 of Table 8, we see that special factors probably have been at work in some areas during the decade. The coefficients of rank correlation across the nine divisions for changes in wage indexes is .54 between Other Health and All Industries, and only .30 between Hospitals and All Industries. In particular, Hospital wages in the northeast (New England and Middle Atlantic) and the southeast (South Atlantic and East South Central) have risen faster than in the rest of the country. The change in the West South Central was similar to that

in the Mountain and Pacific and these three divisions are grouped as the West' in subsequent tables.

When the differential pattern of change is explored in greater detail (Table 9), we see that wages rose more rapidly in the two eastern regions than in the rest of the country in every major Hospital occupation. The magnitude of the geographical differential, however, was very different across occupations. For registered nurses the rate of wage increase was similar across the country, varying by only .3 percent per annum from the highest to the lowest region. For other professional and managerial workers and for practical nurses, however, the differential was more than 2 percent per annum. The other two occupations show differences of over 1 percent per annum between the fastest and slowest growing regions.

The more rapid growth of Hospital wages in the east revealed in the public use samples is confirmed in two other independent sources of data. From American Hospital Association statistics it is possible to calculate average annual earnings per full-time-equivalent personnel in 1959 and 1969. The average annual percentage rate of change of this measure is: Northeast 5.8, North Central 4.9, Southeast 5.2, and West' 4.8. Martin Feldstein has used Bureau of Labor Statistics wage survey statistics to calculate indexes of weekly wages for four metropolitan areas (one in each region) in 1960 and 1969.¹⁰ The implied average annual percentage rate of change is: New York City 7.8, Cleveland 6.0, Baltimore 7.2, and San Francisco 5.9. The differentials across the metropolitan areas are similar to those revealed in the Census data and the AHA statistics, but the rates of change are appreciably higher in the BLS data. This discrepancy should be investigated.

Table 9. Average annual rate of change (percent) of wages (adjusted for age and schooling) of white females, 1959 to 1969, by region, selected industries and occupations.

Category	U.S.	Northeast	North Central	Southeast	West'
All Industries	4.3 ^{b/}	4.4	4.2	4.5	4.2
Other Health	4.6	5.0	4.3	5.3	4.4
Hospitals	5.5	5.8	5.3	6.1	5.1
Registered nurses ^{a/}	6.2	6.3	6.0	6.3	6.2
Other prof. & mgrl. ^{a/}	5.5	5.9	5.4	6.6	4.5
Practical nurses ^{a/}	6.5	7.3	5.8	8.0	5.6
Other service ^{a/}	5.1	5.5	4.8	6.2	4.6
Clerical ^{a/}	4.7	5.0	4.6	5.3	4.1
Government ^{a/}	5.0	5.5	4.3	5.9	4.7
Private ^{a/}	5.8	6.0	5.8	6.2	5.3

^{a/} In hospitals.

^{b/} Actual hourly earnings increased by 4.5 percent per annum, but .2 percent per annum was due to a change in the age-schooling mix.

One of the reasons given by Feldstein for the rapid growth of hospital wages in general is the rapid expansion in demand for hospital staff. The national data are consistent with this view. Between 1959 and 1969 the number of hospital workers per capita in the U.S. grew at 3.4 percent per annum compared to an increase of only 1.4 percent per annum for total non-agricultural wage and salary employment. The regional differentials in hospital employment growth, however, suggest that changes in demand are only a partial explanation. The Northeast, which had above average growth in Hospital wages, had the slowest growth of Hospital employment per capita in the country.

Feldstein presents indexes by occupation for each metropolitan area that tend to confirm the results presented in Table 9--namely above average increases in nursing wages and below average increases for clerical personnel. The one major discrepancy is that "housekeeping" wages rise faster than the all-hospital average in three of the four metropolitan areas, whereas the "other service" wage indexes shown in Table 9 rise less rapidly than the all-hospital average in three of the four regions. This may be because in Feldstein's calculations hourly wage rates were used for housekeeping and weekly wage rates for the other occupations.

Changes Since 1969

One of the major limitations of the public use samples is that they appear only once every ten years. We have seen that Health workers, starting at a relatively low wage level in 1959, had by 1969 risen to a point of almost parity with other industries. Indeed, some Health

workers, especially those in Hospitals and particularly registered nurses, had by 1969 standardized wage indexes far above unity. We have also seen how Hospital wages have tended to rise faster in the East than in the mid- or far-West.

What has happened since 1969? To answer that question, we introduce a few measures from the American Hospital Association data on Hospital payrolls and the U.S. Department of Labor estimates of earnings in private non-agricultural industries. Table 10 shows Hospital wages rising 1.2 percent per annum faster during 1959-69 and continuing with a .5 percent differential during 1969-74. The AHA regional data show that hospital wages continued to rise particularly rapidly after 1969 in the Northeast, but rose less rapidly in the Southeast than in the country as a whole. The West (including the West South Central) continued to rise at the slowest rate.

Conclusion

The data presented in this paper permit a fairly unambiguous answer to the question posed in the title. Health workers are not, on average, underpaid, compared with workers of the same sex, color, age and schooling in other nonfarm industries. This average equality does encompass some relative differentials within the Health field: e.g., females do relatively better than males, Hospital workers do better than workers in other Health settings, and some occupations, especially registered nurses, earn much more than other occupations even after standardization for years of schooling.

Table 10. Rates of change of wages, Hospitals and non-agricultural industries, 1959-69 and 1969-73.

Category	1959-69	1969-74
Private non-agricultural industry (Adjusted hourly earnings) ^{a/}	4.0	6.7
Hospitals (AHA data) (Annual earnings per full-time equivalent)	5.2	7.2
Northeast ^{b/}	5.8	8.0
North Central ^{b/}	4.9	7.3
Southeast ^{b/}	5.2	6.9
West ^{b/}	4.8	6.5

^{a/} Adjusted for overtime (in manufacturing only) and for interindustry employment shifts.

^{b/} Hospitals - AHA data.

Sources: Economic Report of the President, 1975, American Hospital Association.

The data also indicate very clearly that this equality was achieved since 1959. At that time the standardized wage indexes for both Hospital workers and those in Other Health settings were 14 percent below the All Industry norm. There was a substantial "catching-up" in the 1960's and a persistence of this differential rate of growth, at least for Hospitals, in the 1970's. The earnings of Hospital nurses, both registered and practical, stand out as having experienced the most rapid rates of increase.

Another conclusion of this study is that geographical differentials in Health wages are closely correlated with geographical differentials in all nonfarm wages. If, for instance, we know the national wage index for Hospital workers and the regional wage index for all nonfarm workers, we can predict with considerable accuracy the Hospital wage index in that region. There was, however, some significant variation in the rate of growth of Hospital wages across regions, notably wages in the East rose faster than in the mid- or far-West in the 1960's. The rapid wage gains were accompanied by above average rates of growth in Hospital employment per capita in the Southeast, but by relatively slow growth in the Northeast. The next task is to explain systematically the variations in rates of change of Hospital wages across regions, occupations and Health settings, and to analyze the industry's response to these variations.

FOOTNOTES

1. See, however, studies by Altman [1970], Benham [1971], Ehrenberg [1974], M. Feldstein [1971], and Yett [1970].
2. The pioneering work of Friedman and Kuznets [1945] was followed by many other studies, e.g. Hansen [1964], Benham, Maurizi and Reder [1968], and Sloan [1970].
3. Except for very young workers. See Michael Hurd [1971].
4. This point was made to me by Giora Hanoch.
5. Assume that 15 percent of the workers who had earnings in 1969 were not employed in the Census week in 1970. Assume that compared to those workers who were employed both in 1969 and the Census week in 1970, their annual hours were 40 percent less and their average hourly earnings were 25 percent less. Their inclusion, if possible, would have lowered average hourly earnings by a bit over 2 percent.
6. If we know the ratio to all industries (X) and we know the fraction of total employment (n) accounted for by the industry in question, then the ratio to all other industries (A) is given by

$$A = (X - nX) \div (1 - nX).$$

If X is fairly close to one and n is fairly close to zero, then the ratio to all other industries is approximately

$$A \approx X + n(X - 1).$$

Thus, if X = 1.10 and n = .1, then A = 1.112. If X = 1.10, n = .2, then A = 1.128. If X = 1.20, n = .1, then A = 1.227. For the Health Industry

as a whole, $n = .06$, but for the category "white females, 13-15 years of schooling" $n = .18$.

7. The tendency for male earnings to be low in industries and occupations that are predominantly female is not limited to the Health field. In an earlier study of sex differentials in earnings across 46 industries, I found that, ceteris paribus, hourly earnings of males decreased .2 percent for every one percentage point increase in the female share of industry employment. [Fuchs, 1971]

8. For the actual and expected hourly earnings by division, see Appendix Table D.

9. The major exception is Hospital wages in New England in 1969, which were the highest in the country, although wages in other New England industries were at the national average.

10. See M. Feldstein [1971].

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Appendix Table A. Number of observations.^{a/} (All numbers in 100's.)

Category	All Health		Hospitals	
	1960	1970	1960	1970
ALL	19,288	34,489	14,492	23,630
<u>COLOR-SEX</u>				
White males	3,178	4,988	2,540	3,782
White females	13,191	23,851	9,446	15,399
Non-white males	877	1,205	803	1,014
Non-white females	2,042	4,445	1,703	3,435
<u>WHITE FEMALES</u>				
<u>Census Division</u>				
Northeast	1,153	1,927	833	1,293
Mid-Atlantic	2,468	4,137	1,770	2,749
East North Central	2,758	5,016	2,031	3,282
West North Central	1,395	2,626	1,058	1,681
South Atlantic	1,476	2,830	1,022	1,822
East South Central	636	1,159	474	785
West South Central	1,003	1,925	704	1,170
Mountain	555	1,045	400	686
Pacific	1,747	3,186	1,154	1,931
<u>AGE</u>				
14-19	889	1,660	629	907
20-24	1,803	4,042	1,343	2,808
25-34	2,513	4,354	1,822	2,907
35-44	2,781	4,396	1,935	2,745
45-54	2,908	4,979	2,086	3,196
55-64	1,819	3,593	1,313	2,354
65+	478	827	318	482
<u>SCHOOLING</u>				
≤ 8	1,970	2,230	1,517	1,366
9-11	2,090	3,305	1,528	2,075
12	4,812	9,561	3,241	5,934
13-15	3,316	6,669	2,433	4,513
16	807	1,659	580	1,212
17	196	427	147	299
<u>OCCUPATION</u>				
Registered nurse	3,959	5,928	3,178	4,521
Other professional & mgrl.	2,840	3,820	1,186	1,913
Practical nurses	950	1,461	627	1,099
Other service	3,103	7,672	2,586	4,330
Clerical	3,207	5,476	1,503	3,157

^{a/}Wage and salary workers with less than 18 years of schooling employed in the Census week with earnings in the previous year.

Appendix Table B. Actual and expected hourly earnings in 1959.

Category	All Health		Hospital		Other Health	
	Actual	Expected	Actual	Expected	Actual	Expected
White males	2.03	2.77	1.97	2.72	2.29	2.97
White females	1.55	1.72	1.54	1.71	1.56	1.75
Non-white males	1.53	1.75	1.52	1.74	1.64	1.81
Non-white females	1.24	1.22	1.27	1.21	1.09	1.22
All	1.61	1.87	1.59	1.86	1.64	1.90

Appendix Table C. Actual and expected hourly earnings in 1959 for selected occupations.

Category	Actual	Expected
<u>WHITE FEMALES</u>		
Dieticians	1.75	2.03
Registered nurses	1.88	1.86
Health technicians	1.84	1.85
Teachers, excl. college, university	2.81	2.47
Social and rec. workers, excl. Health	2.10	2.40
Librarians	2.45	2.50
Secretaries--Health	1.64	1.79
Other clerical--Health	1.48	1.70
Secretaries--except Health	1.94	1.75
Other clerical--except Health	1.73	1.67
Practical nurses	1.26	1.61
Nursing aides, orderlies	1.16	1.53
Other service workers--Health	1.15	1.50
Hairdressers and cosmeticians	1.42	1.57
Other service workers--excl. Health	1.14	1.53
Private household workers	.68	1.45
<u>WHITE MALES</u>		
Health technicians	2.24	2.76
Craftsmen and operatives--Health	2.04	2.68
Engineering and science technicians	2.81	2.73
Craftsmen and operatives--excl. Health	2.51	2.53

Appendix Table D. Actual and expected hourly earnings for white females, Hospitals and Other Health, by Census division, 1959 and 1969.

Census division	Actual				Expected			
	Hospitals		Other Health		Hospitals		Other Health	
	1959	1969	1959	1969	1959	1969	1959	1969
Northeast	1.63	3.02	1.53	2.66	1.71	2.68	1.71	2.66
Mid-Atlantic	1.63	3.00	1.68	2.67	1.69	2.70	1.77	2.68
East North Central	1.58	2.76	1.67	2.51	1.68	2.67	1.72	2.61
West North Central	1.38	2.50	1.28	2.04	1.68	2.69	1.72	2.61
South Atlantic	1.39	2.64	1.44	2.49	1.72	2.69	1.75	2.68
East South Central	1.29	2.32	1.34	2.22	1.70	2.66	1.68	2.64
West South Central	1.36	2.27	1.39	2.13	1.73	2.65	1.74	2.62
Mountain	1.55	2.57	1.47	2.27	1.75	2.79	1.78	2.75
Pacific	1.79	3.09	1.78	2.71	1.78	2.83	1.82	2.75