

Physician-leaders and hospital performance: Is there an association?

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Abstract

Although it has long been conjectured that having physicians in leadership positions is valuable for hospital performance and patient care, there is no published evidence. This project collected U.S. data on the top-100 hospitals in each of three fields: Cancer, Digestive Disorders, and Heart & Heart Surgery. The names of the chief executive officers of the 3x100 hospitals were traced; these individuals were classified into physicians and non-physician managers. A strong positive cross-sectional association was found between hospital performance and physician-leadership ($P < 0.001$); the association remained statistically significant after controlling for potential confounders. This evidence raises an important question. Can a research-study be designed to test definitively whether having a physician-leader is beneficial to later hospital performance?

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INTRODUCTION

The United Kingdom (UK) recently established five Academic Health Science Centres (AHSCs)¹. Their mission is to bring the practice of medicine closer to research -- in the hope that innovative science can more quickly be translated into clinical procedures (1). Physician leadership has been prioritised in a recent National Health Service (NHS) review: “We challenge all organizations that do business as part of, or with, the NHS to give physicians more control over budgets and HR decisions” ... “There must be a stronger role for clinical leadership and management throughout the NHS” (2-4). Currently in the UK and the United States (US), most hospital chief executive officers (CEOs) are non-physician managers rather than physicians (2,5). In the past, hospitals were routinely led by doctors. That has changed.

It has been suggested that placing physicians into leadership positions can result in improved hospital performance and patient care (2-9). Calls for the inclusion of management and leadership education into medical training are being taken seriously (9-13). Some outstanding American medical facilities -- for example the Cleveland and Mayo Clinics -- have explicitly introduced leadership training. Similar initiatives are taking place in the UK (14). A new literature is developing around the key competencies required to be an effective physician-leader (15-17).

In an unpublished study, English hospitals with higher numbers of physicians in management positions have been shown to have outperformed, across a number of performance measures, hospitals with fewer physician-managers (18). Health policy has been influenced by organisations such as Kaiser Permanente in the US, which has a culture of physician leadership (8,19). To identify a causal relationship between leadership and organizational outcomes is challenging. Unlike in medical trials, random assignment -- in this case of chief executive officers to hospitals -- cannot here be used.

THE STUDY'S EVIDENCE

This paper provides an empirical inquiry (20,21). It addresses the question: are CEOs in outstanding hospitals typically physicians or non-medical managers?

The paper identifies who are the CEOs of the top performing hospitals in America -- determining whether those hospitals with the highest performance scores are more likely to be headed by physician-leaders or professional managers. To do this an established hospital ranking is used (US News and World Report). The dataset the study constructs examines CEOs in the top-100 hospitals in the three specialties of Cancer, Digestive

¹ Imperial College, Cambridge University Health Partners, King's Health Partners, Manchester AHSC and UCL Partners

Disorders, and Heart & Heart Surgery (22). The potential confounders of size of hospital and university hospital type are recognized; appropriate adjustments are made for those.

If, in US data, the best-performing institutions are led systematically by medical experts rather than managers, this is one form of evidence that physician-leaders may be effective CEOs of hospitals. Elite institutions are likely to have the greatest choice of candidate.

Data Collection and Methods

'America's Best Hospitals' 2009 by *US News & World Report* (USNWR) is used in this study (22). The USNWR ranking is designed to inform consumers about where to seek treatments for serious or complex medical problems. Using rating systems as heuristic devices to assess health care providers has become common. In the literature, vigilance about reliance on rankings is reported, as are the strengths and weaknesses of the USNWR rating (23-26). The study has selected this classification because its Index of Hospital Quality (IHQ) incorporates a number of objective empirical measures, and its methodology is the most established.

In the 2009 USNWR ranking, around 5000 medical facilities are assessed in 16 specialties. Both hard data and reputational scores are used for 12 of the specialties, which include: Cancer, Diabetes & Endocrine Disorders, Digestive Disorders, Ear, Nose & Throat, Geriatric Care, Gynaecology, Heart & Heart Surgery, Kidney Disorders, Neurology & Neurosurgery, Orthopaedics, Respiratory Disorders, and Urology. For the remaining 4 -- Ophthalmology, Psychiatry, Rehabilitation, and Rheumatology -- only physicians' reputational score is used by USNWR.

No single general ranking exists in the USNWR tables. Instead, the top 50 hospitals are identified in each of these 16 areas. In addition, there is an 'Honor Roll' of hospitals that perform well in at least 6 of the 16 specialties. Twenty-one institutions make the 2009 Honor Roll.

The collected data cover the top-100 hospitals in each of three specialist fields: Cancer, Digestive Disorders, and Heart & Heart Surgery. These were selected because they have been assigned an IHQ score based on hard data and not solely on reputation (which is subjective); also, these specialties represent ailments that are important and common. Depending on the field, between 800 and 1200 hospitals make it into each specialty category. The names of the top-50 in each of the specialties are published in USNWR. To identify the second 50 (which creates the top-100), the study ranked all the remaining hospitals first by their IHQ score, and, second, by their reputational score, which thereby replicates the USNWR methodology (namely, that identifying the top-50). This generated a ranking of top-100 hospitals.

In the statistical analyses, the IHQ score is used; this is because it is a more exact and objective measure of performance than either its reputational score or a hospital's ranked position (i.e. 1-100). (A test for ranked position is done and included in a footnote).

Next, data were collected on hospital CEOs. To do this, the study used hospitals' websites, and also personal contact with institutions when necessary. Each CEO was classified into one of two categories -- physician-leaders, and leaders who are non-physician managers. To qualify as a physician-leader, by this study's criteria, a CEO must have been trained in medicine (MD). Some information was available about the extent to which MD-trained leaders in my dataset had been career physicians. Most MD CEOs reported that they had clinical experience. However, it was not possible to accurately assign the level or number of years of clinical experience that each CEO had obtained. This will be important information for future research in this area.

There were three nurses among the CEOs in the sample, and they were categorized as non-physicians.

Statistical Analysis

To establish whether hospitals that are higher in the USNWR performance rankings are more likely to be led by physicians than managers, the study uses t-tests and regression equations. It runs these empirical tests for the top-100 hospitals in the specialties of Cancer, Digestive Disorders, and Heart & Heart Surgery. For Cancer, it estimates a multivariate regression analysis with a control variable. As a proxy for size of hospital, the study includes a variable for the number of beds in each of the 100 facilities.

Statistical results are presented in tables and bar diagrams.

Table 1 gives a description of the data, with means and standard deviations, for the field of Cancer². In this field and in each of the specialties -- with a total of between 800-1200 hospitals -- the IHQ (performance) scores run from zero to a high of 100. Among the top-100 cancer hospitals, the IHQ score runs from a maximum of 100 to a minimum of 19.30³. The mean score is 28 (SD = 12.6). There are 51 physician-leaders among these 100 CEOs. Thirty-three are in the top 50 hospitals and 18 lead hospitals in the lower 50 group. Of the 100, 15 of the CEOs are female.

Some interesting differences are immediately apparent. The mean performance score of Cancer hospitals led by physicians is 31.63 (SD = 16.29) and the mean performance score of Cancer hospitals led by non-MD managers is 23.61 (SD = 4.18). For the control variable of hospital size -- represented by number of beds -- the mean number of beds is 652 (SD = 361).

In the specialty of Digestive Disorders, the performance (IHQ) scores lie between 100 and 16.60. The mean score is 21.97 (SD = 11.18). The mean performance score of the subset of these hospitals led by physicians is 28.04 (SD = 17.37), and the mean performance score of the hospitals led by managers is 18.85 (SD = 2.84). Finally, in Heart and Heart Surgery the performance scores awarded to the top-100 hospitals are

² For reasons of space, a table with descriptive data is only given in one of the three specialty fields.

³ The IHQ scores do not follow a normal distribution. With a sample of 100 observations, however, there is no appreciable bias to results.

between 100 and 20.30, and the mean is 25.80 (SD = 11.24). The mean performance score of the Heart hospitals that are led by physicians is 31.51 (SD = 16.93), and the mean performance score of Heart hospitals led instead by managers is 22.44 (SD = 2.09).

RESULTS

Hospitals in the Specialty of Cancer

Figure 1 (and later, in regression-equation form, Table 2) present the details of the results for the field of Cancer. Table 2 demonstrates the relationship more formally.

The key result -- with or without regression adjustment -- is that physicians lead the better hospitals. The finding is presented in a graphical form in quartiles in Figure 1, which shows an approximately monotonic fall in the number of physician-leaders as hospital performance scores decline across the 100 hospitals in the specialty of Cancer. The reverse pattern (necessarily) is seen in the data for CEOs who are non-physician-managers.

It is statistically more common for a hospital with a higher performance score to be headed by an MD instead of a non-physician manager ($P < 0.001$). The size of the association is, in the cross-section, an approximate extra 8 performance points from having a physician-CEO, which is equal to two-thirds of 1 standard deviation in hospital performance. To test whether the size of hospital is a confounding factor, the study includes a variable for the number of hospital beds. The relationship with leader-type remains statistically significant when this control variable, and one for university-hospital-form, is included ($P < 0.001$)⁴.

Hospitals in the Specialty of Digestive Disorders and Heart & Heart Surgery

When the data are analysed for the specialties of Digestive Disorders and Heart & Heart Surgery, the same pattern can be observed. For brevity, no regression tables are included, but the cross-sectional pattern is presented in quartiles in Figures 2 and 3. Regression results confirm that in these two fields, of Digestive Disorders and Heart & Heart Surgery, hospitals with a higher performance score are again more likely to have a physician CEO than a non-physician manager ($P < 0.001$). In both specialties, the size of the association with having a physician-CEO is an approximate extra 8-9 performance points, which is equal to two-thirds of a standard deviation in hospital performance.

‘Honor Roll’ Hospitals

Finally, at the most elite level, it is possible to study the leaders in the USNWR ‘Honor Roll’. These are the hospitals that scored highest in at least 6 (out of a total of 16) medical specialties. The great majority of CEOs, 16, in the 21 top-performing hospitals are physicians. Among the Honor Roll hospitals, USNWR scores are graded differently; they vary on a scale from a maximum score of 30 to a minimum score of 7. The mean

⁴ When estimated as a rank (i.e. 1-100) rather than a performance score, the results remain the same.

hospital performance score for the Honor Roll is 21.08 (SD = 4.63). Of the hospitals run by physicians, the mean score is 18.38 (SD = 7.37), and the average performance score of hospitals led by managers is 12.60 (SD = 5.03).

CONCLUSION

There has been much discussion in the USA about the relative merits of having physicians and non-physician managers in leadership positions. This study offers the first evidence. It finds that the best-performing hospitals are led disproportionately by physicians. These data reveal -- in each of three disciplinary fields -- that the better a hospital's performance the more likely it is that its CEO is a physician and not a manager.

This study's results are cross-sectional associations⁵. They suggest that it is important to design longitudinal inquiries into the possibility that physician leaders improve the (later) performance of American hospitals.

⁵ Another such study, although not concerned with leadership, is 27, which influenced this paper's choice of title.

Table 1. Data Description: An Example The Top-100 US Hospitals in the Treatment of Cancer ¹ and their Leaders	
Number of Physician-Leaders (across the 100 Hospitals) ²	51
# Non-Physician Managers	49
# Physician-Leaders in the Subsample of Top-50 Hospitals	33
# Physician-Leaders in the Bottom-50 Hospitals	18
Mean Hospital Performance Score for Cancer (Max 100, Min 19.30 ³ , SD = 12.6)	28.00
Mean-Performance Cancer Score of Hospitals led by Physicians (Max 100, Min 19.30 ³ , SD = 16.29)	31.63
Mean-Performance Cancer Score of Hospitals led by Managers (Max 40.4, Min 19.30 ³ , SD = 4.18)	23.61
Mean of Hospital Beds (SD = 361)	652
Number of Female Leaders (across the 100 hospitals)	15
# Hospitals	<i>n = 100</i>

¹Data from US News and World Report 'Best Hospitals' 2009

²Physician-leaders and non-physician leaders are the CEOs – the executive heads of hospitals.

Figure 1.
Proportion of Clinicians and Non-Clinician Managers as CEOs in the Top 100 U.S. Hospitals in the Field of Cancer: By Quartiles*

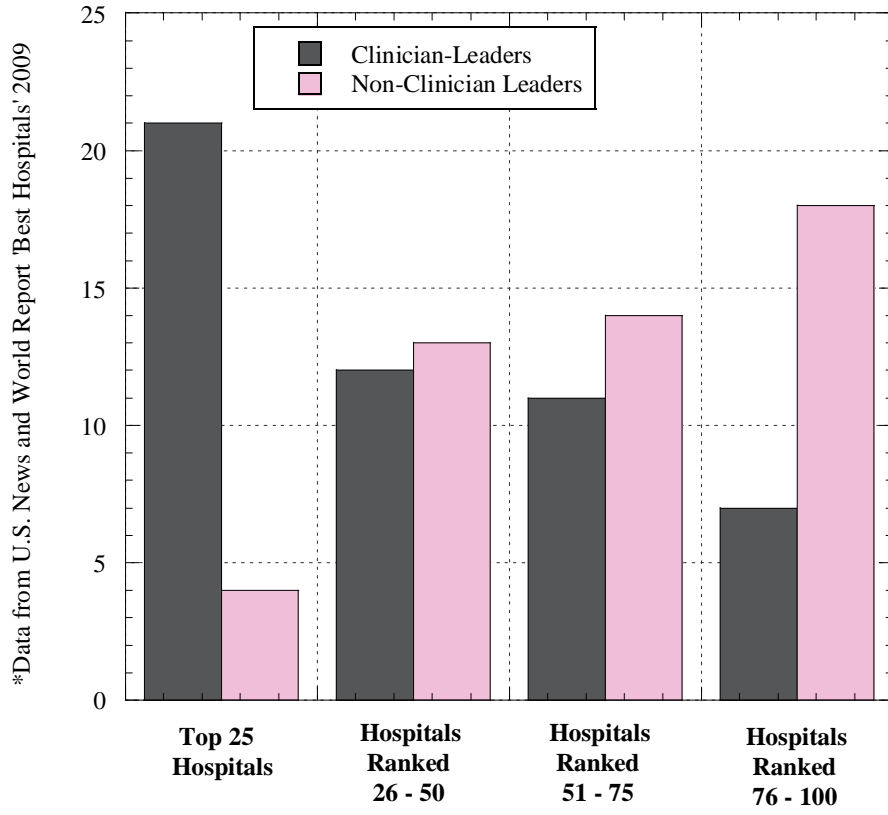


Figure 2.
Proportion of Clinicians and Non-Clinician Managers as CEOs in
the Top 100 U.S. Hospitals in the Field of Digestive Disorders:
By Quartiles*

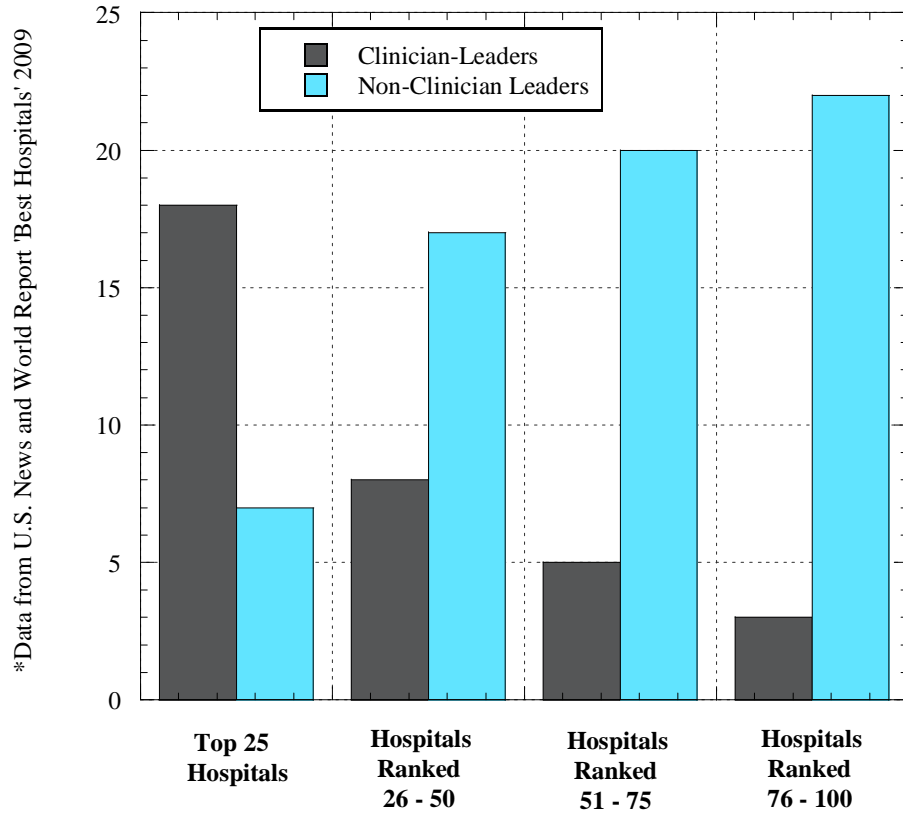
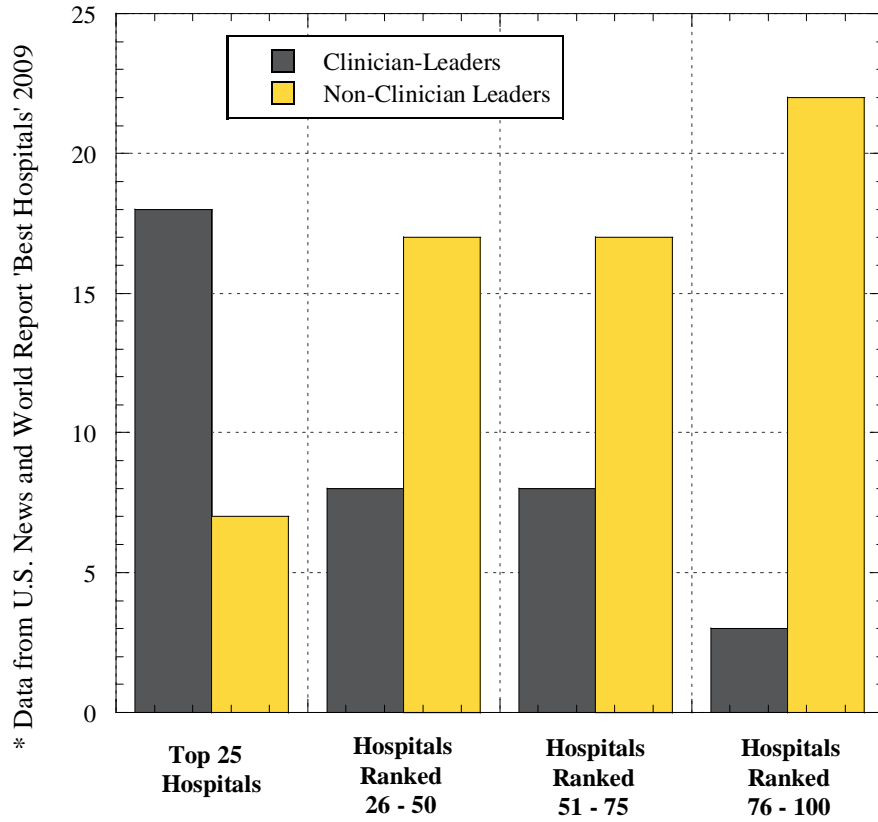


Figure 3.
Proportion of Clinicians and Non-Clinician Managers as CEOs in
the Top 100 U.S. Hospitals in the Field of Heart & Heart Surgery:
By Quartiles



**Table 2. Regression Equations where the Dependent Variable is
the Performance Score of the Top-100 U.S. Hospitals in the
Treatment of Cancer¹**

<i>Independent Variables</i>	1	2	3
Hospital Led by Physician ²	8.017*** (3.34)	7.989*** (3.27)	7.823** (3.15)
Number of Hospital Beds		0.001 (0.25)	0.001 (0.19)
Hospital with 'University' in the Title ³			1.001 (0.69)
R ²	0.09	0.08	0.08
Constant	23.6	23.1	22.7
	(13.77***)	(8.29***)	(7.86***)
n=100			

Coefficients are shown with t-statistics in parentheses; ***p<0.001 **p<0.01 *p<0.05

¹ Data from US News and World Report 'Best Hospitals' 2009

² This is a dummy variable where 1 = Physician leaders; 0 = Non-Physician leaders

³ This is a dummy variable where 1 = 'University' in title; 0 = No mention of university in title.

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