Social Science & Medicine 77 (2013) 147–155

Contents lists available at SciVerse ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Clinicians on the board: What difference does it make?

Gianluca Veronesi*, Ian Kirkpatrick [1], Francesco Vallascas [2]

Leeds University Business School, The University of Leeds, Maurice Keyworth Building, Leeds LS2 9JT, UK

ARTICLE INFO

Article history:
Available online 27 November 2012

Keywords:
Board of directors
Clinical leadership
Hospital governance
Quality of services
United Kingdom

ABSTRACT

Around the world clinical professionals have increased their involvement in the management of health services. However the evidence to suggest that these changes will lead to improved performance remains fragmented. In this paper we address this matter focussing on the impact of clinicians appointed to the boards of directors of English NHS hospital trusts. Although the number of clinicians involved in the strategic governance of hospital trusts is relatively low by international standards, they do appear to have an impact on overall performance. Drawing on published information from hospital trust annual reports, publicly available performance measures from the Healthcare Commission and data gathered by Dr Foster over a three year period (2006–9), the paper reports two main findings. First, the analysis reveals a significant and positive association between a higher percentage of clinicians on boards and the quality ratings of service providers, especially where doctors are concerned. This positive influence is also confirmed in relation to lower morbidity rates and tests to exclude the possibility of reverse causality (doctors joining boards of already successful organisations). Second, we do not find the same level of support for clinical professions such as nurses and other allied health professions turned directors.

Introduction

The role of health professionals has been subject to marked change in recent years in a context of shifting technology, public expectations, population needs and the management of services (Kuhlmann & Annandale, 2012). The latter has resulted in greater financial constraint, external regulation and competition, although one of the most radical changes have been moves to co-opt doctors and nurses themselves into management roles (Numerato, Salvatore, & Fattore, 2012). Attention has focused on involving clinicians more at the middle tier of hospitals (Braithwaite & Westbrook, 2004) as well as in the strategic direction of health care, through membership of hospital boards or as fund-holders responsible for the commissioning of services. These changes have gone hand in hand with the wider restructuring of health systems, exposing organisations such as hospitals to greater competition for resources and moving them closer to a governance model of private firms (Farrell, 2005).

In much of the literature, this development of 'hybrid' clinical-professional roles is often understood as part of a broader process of re-stratification (Freidson, 1985; Kirkpatrick, Jespersen, Dent, & Neogy, 2009). Attention has concentrated on the emergence of new 'administrative elites' within the clinical professions and how this, in turn, has helped to extend management control over the practice of rank and file professionals, turning 'poachers into gamekeepers' (Harrison & Ahmad, 2000). By contrast, far less attention has been given to the consequences of these developments for the quality of health care. Here the question that arises is how far (if at all) the participation of clinical managers in the governance of health organisations makes a difference to their performance?

Amongst policy makers there is now strong support for the idea that stronger clinical leadership will have positive consequences (Ham, Clark, & Spurgeon, 2011; King's Fund, 2011; Xirasagar, Samuels, & Stoskopf, 2005). This conclusion is also supported by a growing body of international research (see for example, Dorgan et al., 2010). However, questions remain about the specific impact of clinical leadership at more strategic levels. While a number of studies have focused on the dynamics of hospital boards in the US (Goodall, 2011; Prybil, 2006b) with some exceptions (King's Fund, 2012), far less attention has been given to this issue in the English National Health Service (NHS). The results of this research are also inconclusive when it comes to assessing the impact of clinicians on board level decision making.

* Corresponding author. Tel.: +44 (0)113 343 8686.
E-mail addresses: G.Veronesi@leeds.ac.uk (G. Veronesi), I.Kirkpatrick@leeds.ac.uk (I. Kirkpatrick), F.Vallascas@leeds.ac.uk (F. Vallascas).
[1] Tel.: +44 (0)113 343 2611.
[2] Tel.: +44 (0)113 343 4483.

0277-9536/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.socscimed.2012.11.019

The aim of this paper is to address these limitations focussing on the relationship between clinical board membership and performance in the context of NHS trust hospitals. Specifically we concentrate on one measure of performance for hospital trusts, namely the rating on the quality of the service provided given by the Healthcare Commission, a semi-independent regulator in the sector (now superseded by the Care Quality Commission). Tests are also conducted using quality measures relating to patient morbidity gathered by Dr Foster, an independent research institute. Building on the work of Goodall (2011), we focus on the qualifications of all board members (executive and non-executive) and explore relationships with performance over a three year period: 2006/7–2008/9.

Clinicians on the board: the story so far

As noted, it is widely argued that increasing the participation of clinicians in more strategic leadership roles will have benefits for the quality and effectiveness of health services (King's Fund, 2012). In the UK this idea was central to Ara Darzi's review of NHS and the assertion that clinical leadership is necessary to transform services to achieve high levels of excellence (Department of Health, 2008). Linked to this have been attempts to create a 'mixed economy' of clinical and non-clinical senior managers in the NHS with doctors on the shortlist for all future Chief Executive Officer (CEO) appointments (Clarke, 2006, pp. 14–15). Similarly, in the US, Prybil (2006a, p. 22) notes how, as a strategy for improving the quality of hospital care the National Quality Forum and other bodies 'have urged boards to improve their communication with clinical leaders-physicians and nurses-and expand their involvement on boards'.

These assumptions about the positive consequences of clinical involvement in governance are also borne out by some research. This is notably true in the US, where, for some time, even public hospitals adopted corporate style governance arrangements (Kovner, 1990). Studies have found that boards with greater medical participation tend to be associated with increased engagement in quality improvement initiatives (Weiner, Shortell, & Alexander, 1997) and better informed strategic decisions more generally (Ford-Eickhoff, Plowman, & McDaniel, 2011; Goldstein & Ward, 2004). This research also suggests a link between the composition of hospital boards and performance outcomes. Focussing on seven high performing non-profit hospitals and a matched comparison group, Prybil (2006b) finds that the boards of former had engaged physicians in governance more extensively than had the midrange performers. Drawing on a survey of 490 hospital presidents/CEOs Jiang, Lockee, Bass, and Fraser (2009) also conclude that having a board quality committee with strong physician leadership can significantly enhance a hospital's performance. Most recently Goodall (2011), finds a positive association between the medical qualifications of CEOs and the higher ranking of hospitals.

Yet, while this research is promising a number of questions remain. *First* is exactly how much difference managers will make to performance outcomes? In the US, not all studies are equally supportive of the conclusion that greater board level participation of doctors will have positive consequences (Succi & Alexander, 1999). The more limited research on hospital governance in the UK and Europe also casts doubt on how much influence clinicians will have. Focussing on the boards of 22 health organisations in the NHS, Veronesi and Keasey (2011) for example, note how the effectiveness of clinical involvement is highly variable, especially where board discussions are dominated by financial priorities. A study by Addicott (2008) of five cancer network boards also queries the benefits of clinical representation, with some doctors adopting an advocacy role to promote the interests of their own speciality first and foremost.

These (and other) studies therefore raise questions about how far greater clinical participation in strategic decisions will improve performance. Much will depend on whether senior doctors and nurses chose to act opportunistically or as 'ambassadors', focussing on broader corporate priorities of service improvement (Hunter, 1992; Lister, 2000). A related question is the extent to which clinicians will be able to make their voices heard on boards? One might argue that their ability to influence decisions will be hampered not just by a lack of management training (Ham & Dickinson, 2008), but also by limited support and encouragement from non-clinical managers (Veronesi & Keasey, 2011). This is especially when the latter adopt what Edmonstone (2008, p. 296) describes as 'unitary' and 'command and control' viewpoint which 'denies the legitimacy for clinical leadership'.

A second question is whether the positive outcomes of clinical leadership derive from the participation of *all clinicians* in boards (including nurses and allied health professions) or only doctors? The latter follows from much of the sociological literature on health professions. This highlights the dominance of medicine and the ability of doctors, with substantial cultural capital, to influence decisions about diagnosis, treatment and the flow of resources (Harrison & Ahmad, 2000). On the other hand it might be argued that because nursing knowledge tends to be more population focused, 'systematized' and team-based (Degeling, Kennedy, & Hill, 2001), this will enable nurses to directly contribute to strategic decisions, especially when in partnership with doctors (Murphy, Quillinan, & Carolan, 2009; Prybil, 2006b).

Hence, while there are reasons to assume that clinical involvement in the strategic management will have implications for performance, a number of questions remain concerning: the degree to which this will occur and which clinician professionals are most influential.

Data and methodology

To address these questions our focus is on a particular national case: the NHS hospital sector in England. In 2008/9 this consisted of 169 acute care trusts, with a total budget (including community services) of £51.5 billion: approximately 64% of the total budget for front line services. Since the early 1990s hospitals (or in some cases, groups of hospitals) have been constituted as semi-autonomous 'trusts' with their own boards of directors, similar to private firms. Although formally part of the public sector, trusts are required (in theory at least) to secure contracts from primary care organisations that commission services from them. This has meant a much greater emphasis on improving the governance of health trusts with boards expected to take on key roles of formulating strategy, ensuring accountability and shaping culture (Healthcare Commission, 2009). Since 2003 an increasing number of trusts have also been re-designated as 'Foundation Trusts' with greater autonomy to manage their own affairs.

Because there is no central repository of information on NHS trust hospital governance the first step in our research was to construct a unique dataset by manually working through the websites and annual reports of individual trusts. Where possible we observed the composition of the board and, for all members, gathered information on their professional qualifications (for example, doctors, nurses, accountants, etc.) and job titles. Only trusts which offered full information in terms of the membership of their board in each year under investigation were taken into account, resulting in a final sample of 240 observation points from 2006/7 to 2008/9. Using this data we were able to capture changes in the board composition for each hospital trust and year

considered when the data was available. For the final year, 2008/9, 102 trusts (60% of the total population) were represented, the numbers being smaller (57 in 2006/7; 81 in 2007/8) for previous years. The sample was adequately representative of the whole hospital trust population in terms of performance.

Dependent variables

From the HC data one performance measure was used, related to the quality of the service provided (QRATING). This measure was taken from the performance scores incorporated in the ratings of hospital trusts published by the Annual Health Check, with a rating score ranging from 1 (weak) to 4 (excellent). The quality score rates the care and treatment provided assessing compliance with a series of core standards and indicators (67 in total in 2008/09) centrally set by the Department of Health (Healthcare Commission, 2008). These assessments carried out by the HC adopted the same format over the three-year period, allowing us to compare hospital performance over time. The core standards focused on four main areas: health and well-being, clinical effectiveness, safety and patient focus and ease and equity of access. Other indicators focused on waiting times for inpatients and outpatients, referrals to treatments and infection rates.

While performance targets may stimulate positive changes in the behaviour of public organisations (Kelman & Friedman, 2009), a particular criticism of HC ratings is that they failed to adequately capture the quality of the health care provided (Bevan & Hood, 2006). The argument here is that these ratings drew heavily on self-assessments and tended to focus mainly on processes and outputs rather than outcomes. More worryingly, it is suggested that the HC reviews generated perverse incentives for hospitals to 'game' the system by inflating their scores and that consequently more qualitative aspects of performance were ignored or given only secondary importance (Bevan & Hood, 2006).

Notwithstanding these shortcomings, we chose to use HC quality score as a proxy for organisational performance. Although this measure fails to capture every dimension of quality it does at least give some indication of improvements on the dimensions of practice that are measured (Kelman & Friedman, 2009). To further strengthen our analysis we also introduced a series of control variables (see below) and used an additional measure of performance: the hospital standardised mortality ratio (HSMR) collected by Dr Foster. While this measure has been criticised for failing to differentiate between preventable and non-preventable deaths (Lilford & Pronovost, 2010), it does offer a general indicator of hospital outcomes as distinct from the HC focus mainly on processes and outputs (Salge, 2011).

Explanatory and control variables

As noted earlier, in order to evaluate the relationship between the presence of clinicians in leadership positions and the organisational performance, we looked at the biographical profile of the trust board directors for each year included in the study. Firstly, we distinguished between directors with a clinical background (CLINICAL), based on their qualifications and those with a non-clinical background. We then differentiated between the clinical background of directors, segmenting the population into two categories: doctors (DOCTORS) and nurses and other health allied professions (OTHERCL).

We also looked in detail at the professional background/expertise of the top leadership roles in the boardroom, the chief executive officer (CEO) and chair. Here we followed the same procedure adopted for the other board directors, making distinctions between clinical and non-clinical backgrounds (CEOBACK) and between types of clinical background: doctors (CEOBACK_DOC) and nurse/other health allied professions (CEOBACK_OTH). Following the standard procedure in governance research (Kor & Sundaramurthy, 2009), a number of board-related control variables were included such as: board size (BOARDSIZE); board independence (INDEPENDENT); and the gender composition (GENDER).

To account for the possible impact of trust status and context on performance a variety of additional controls were used. Trusts were differentiated in terms of their size with regard to their turnover (ATURNOVER) and as calculated by the total number of beds available (SIZE). We expected larger organisations to be harder to manage, possibly diluting the impact that clinical background of board members might have on performance.

Following a similar line of reasoning, hospital trusts were differentiated according to population served (calculated as the ratio between the number of inhabitants and the number of beds – POPSERVED) and population age (indicated by the mean age of patients – MEANAGE). Furthermore, they were divided into a binary group according to their legal status, whether or not they had converted into Foundation Trusts (FOUNDATION). We also controlled for perceived organisational reputation by distinguishing between trusts with a teaching status (TEACHING) and those without it. Lastly, trusts were differentiated according to their geographical location.

Although not reported in the main analysis for reasons of space, other controls were introduced to specifically account for factors that might impact on quality. We firstly considered the case load (total number of admissions per staff numbers) on the premise that hospitals with a comparatively higher number of admissions would face more serious challenges in running their organisations. In addition, trusts were distinguished according to their operational efficiency (indicated by the percentage of bed occupancy) and the severity of the cases treated in the hospital (proxied by the mean length of stay per patient). While the latter represents an imperfect measure of severity it nevertheless provides some indication of the comparative difficulty of cases faced by trusts.

Methods

Our choice of method to analyse these data was motivated by the nature of the quality rating employed as a dependent variable. More specifically, since the quality rating indicator is an ordinal variable the analysis is conducted through pooled regressions via an ordered logit model. The estimation process is based on the assumption that the ordinal variable, that is, the numerical score which measures the quality rating (Y), is an approximation of a continuous variable (Y^*). In turn, the continuous variable is supposed to be a linear function of a set of explanatory variables as in the specification reported below. Formally, this model assumes that the ordinal variable, in the current case the numerical score measuring the quality rating (Y), taking up to m values, is the ordinal version of an underlying continuous variable (Y^*) which depends linearly on a set of covariates. This is expressed as:

$$Y^*_{i,t} = \boldsymbol{\theta}'\boldsymbol{\chi} + \varepsilon_{i,t} \quad (1)$$

where $\boldsymbol{\theta}'$ is a vector of explanatory variables, including the percentage of clinicians sitting in the board, the set of control variables discussed in the previous section with the addition in some specifications of time dummies. Furthermore, Y is determined by Y^* and by a set of additional threshold parameters $\gamma_1, \gamma_2, \ldots, \gamma_{m-1}$, where m indicates the number of values that Y can assume, as follows:

$$Y \leq j \Leftrightarrow Y^* \leq \gamma_j \quad (j = 1, \ldots, m-1) \quad (2)$$

With the additional assumption that the residual term (ε) has a cumulative logistic distribution, the probability of observing a value of Y not larger than j, conditional on the set of covariates, can be expressed as follows:

$$P(Y \leq j|\boldsymbol{\theta}) = \frac{\exp\left(\gamma_j - \boldsymbol{\theta}'\boldsymbol{\chi}\right)}{1 + \exp\left(\gamma_j - \boldsymbol{\theta}'\boldsymbol{\chi}\right)} \quad (3)$$

This implies a linear relationship between the logit of Y and the explanatory variables, as reported below:

$$\log\left[\frac{P(Y > j|\boldsymbol{\theta})}{P(Y \leq j|\boldsymbol{\theta})}\right] = \boldsymbol{\theta}'\boldsymbol{\chi} - \gamma_j \quad (4)$$

Hence, the model predicts the probability associated with each event and how this probability changes as a consequence of a change in some covariates.

Since the coefficients of the ordered logit model are not linearly related to the probability of occurrence of each event, the impact of the explanatory variables on these probabilities cannot be inferred simply from the estimated coefficients. Therefore, to investigate the impact of our explanatory variables, we also analysed the changes in the predicted probabilities to obtain a rating class determined by an increase in the percentage of clinical directors on boards.

Finally, given the longitudinal structure of our sample – with the presence of repeated observations for each hospital trust – inferences are based on robust standard errors clustered at the hospital trust level. This allows for the presence of within group (cluster) correlation, relaxing the conventional requirement for observations to be independent.

Results

Table 1 presents the descriptive statistics and the definitions for the explanatory and control variables employed for the 3-year period. Firstly, it can be seen that on average clinicians make up just over a quarter of the board members (26.03%). In the majority of cases these were executive board posts, including the statutory roles of nurse and medical director, but also CEOs, chairs and other roles such as Director of Operations. When further broken down it transpires that doctors represent on average approximately 14% of the board members while nurses and the other allied professions account for 12%. With regard to the background of the CEO, the data illustrate that around 22% of the CEOs have a clinical background, with roughly an equal ratio of CEOs being classified as doctors or nurses and other allied professions. The statistics for the chair role, not reported here for the sake of brevity, show that only a minimal percentage of chairs (around 6%) come from the clinical profession.

As can be seen in Table 2 Panel A, the largest share of the sample of trusts achieved a quality rating of at least three over the three years, with 82 observation points (34.17% of the total sample) attaining the maximum score. Table 2 Panel B then reports the distribution of the sample by percentage of clinicians, doctors and other clinicians on the board respectively. Crucially, the data reveal a statistically significant pattern indicating links between an increasing presence of clinicians on boards and a progressively superior quality rating. Notably, trusts that achieved the highest average ratings where those which also, on average, had the highest shares of clinicians on their boards (see fourth group row for the distribution by percentage of clinicians directors). However, when looking at the different clinical categories, the evidence suggests that a greater percentage in the number of doctors on boards was related to an average better quality rating. As highlighted in Table 2 Panel A, trusts achieving a four rating had, on average, a 15.01% percentage of directors with a medical background, whereas in those awarded with a one the percentage of doctors on the board stood at 11.09%. By contrast, the pattern was more ambiguous – and not statistically supported – where nurses and other allied health professions are concerned.

Table 3 columns (1–4) illustrate the regression results on the impact of clinically qualified board members on the quality rating of trusts. As can be seen, the share of clinicians on boards appears to be a positive and significant determinant of the dependent variable for the specifications of the model from (1) to (3), whereas (4) is only marginally insignificant (p-value 10.4). Regarding the impact of the various control variables included in the model, we found, not surprisingly a positive relationship between the FT status and the quality rating. More surprising was the lack of any significant association between being a teaching hospital and the quality rating. Traditional governance variables such as board size and independence also appeared to have no statistically significant impact. However, the analysis did suggest that hospital trusts that are smaller in terms of financial turnover appear to achieve better quality ratings. This is also accounted for by the fact that smaller trusts tend to be located in areas with healthier populations whereas larger trusts normally deal with a variety of more complex clinical cases.

Table 3 columns (5–11) provide greater insight into which clinical professionals are having most impact. Here it can be seen that doctors are having a statistically significant impact, a finding

Table 1
Variable definitions and summary statistics.

		N	Mean	Median	S.D.	Min	Max
QRATING	Numerical transformation of the quality rating (%)	240	3.14	3.00	0.77	1.00	4.00
CLINICAL	Number of clinicians on the board divided total board members (%)	240	26.03	25.00	9.20	6.25	60.00
DOCTORS	Number of doctors on the board divided total board members (%)	240	13.84	13.33	7.34	0.00	50.00
OTHERCL	Number of other clinicians on the board divided total board members (%)	240	12.19	9.09	6.39	0.00	40.00
CEOBACK	Dummy equal to 1 if the CEO is a clinician	240	0.22	0.00	0.41	0.00	1.00
CEOBACK_DOC	Dummy equal to 1 if the CEO is a doctor	240	0.10	0.00	0.31	0.00	1.00
CEOBACK_OTH	Dummy equal to 1 if the CEO is a clinician but not a doctor	240	0.11	0.00	0.32	0.00	1.00
BOARDSIZE	Log transformation of the total number of board members	240	2.51	2.48	0.14	2.20	2.94
INDEPENDENT	Number of non-executive directors divided total board members (%)	240	51.29	50.00	5.73	31.25	63.64
GENDER	Number of female directors divided total board members (%)	240	34.72	33.33	12.55	7.14	80.00
ATURNOVER	Turnover divided by the number of staffs	240	63.60	58.66	28.98	15.96	381.37
SIZE	Log transformation of the number of beds	240	6.40	6.50	0.61	4.17	7.62
MEANAGE	Mean age of patients	240	49.38	50.00	8.10	6.00	66.00
POPSERVED	Number of inhabitants divider number of beds	240	6.60	6.31	1.07	5.05	11.03
FOUNDATION	Dummy equal to 1 for foundation trusts	240	0.73	1.00	0.45	0.00	1.00
TEACHING	Dummy equal to 1 for teaching trusts	240	0.42	0.00	0.49	0.00	1.00

Period: from 2006/7 to 2008/9.

Table 2
Sample distribution.

Panel A: Distribution by quality rating

Quality rating class	N	%	CLINICAL		DOCTORS		OTHERCL		CEOBACK		CEOBACK_DOC		CEOBACK_OTH		ATURNOVER		SIZE		FOUNDATION	
			Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1	8	3.33	21.42	6.22	11.09	8.71	10.33	2.76	0.00	0.00	0.00	0.00	0.00	0.00	66.01	33.31	6.57	0.29	0.50	0.53
2	33	13.75	23.38	8.45	12.51	6.45	10.87	5.23	0.12	0.33	0.06	0.24	0.06	0.24	71.52	63.19	6.41	0.51	0.61	0.50
3	117	48.75	26.31	9.50	13.59	7.54	12.72	6.79	0.26	0.44	0.12	0.33	0.14	0.35	61.75	18.99	6.45	0.52	0.73	0.45
4	82	34.17	27.14	9.11	15.01	7.44	12.13	6.45	0.22	0.42	0.11	0.31	0.11	0.31	62.81	16.03	6.30	0.76	0.80	0.40

Panel B: Distribution by Percentage of Clinicians, Doctors and Other Clinicians on the Board

Distribution	By % of clinicians				By % of doctors				By % of other clinicians			
	% per group	*N* of trusts	% of trusts	Average quality rating	% per group	*N* of trusts	% of trusts	Average quality rating	% per group	*N* of trusts	% of trusts	Average quality rating
Group 1	≤19.4	60	25.0	2.92	≤8.3	70	29.2	3.00	≤8.3	60	25.0	3.20
Group 2	>19.4–≤25	68	28.3	3.13	>8.3–≤13.3	55	22.9	3.11	>8.3–≤9.1	69	28.8	3.04
Group 3	>25–≤30.8	55	22.9	3.16	>13.3–≤18.2	69	28.8	3.22	>9.1–≤15.4	52	21.7	2.98
Group 4	>30.8	57	23.8	3.36	>18.2	46	19.2	3.26	>15.4	59	24.6	3.32
Total		240	100.0	3.14		240	100.0	3.14		240	100.0	3.14
T-Test (Gr. 4–Gr. 1)				0.44*** (3.109)				0.26* (1.674)				0.12 (0.313)

Period: from 2006/7 to 2008/9.
***$p < 0.001$, *$p < 0.1$.

that is confirmed for all the specifications of the model. Conversely, the dummy variable identifying nurses and other allied professions enters all specifications with a positive but not statistically significant coefficient. We find the same results of the previous regression for all the reported control variables. Hence, we can conclude that, in our sample, achieving a higher quality rating can be significantly associated to having a greater share of clinicians, especially doctors, on boards.

To further elaborate these results we computed the changes in the probability to achieve a given rating class for an increase in the share of doctors on boards. Essentially, employing the estimated model reported in column (9) of Table 3, we computed the changes in the probability to achieve a given rating class when all the explanatory variables are fixed at the sample median while the percentage of doctors on boards moves from the 25th to the 75th percentile of the sample distribution.

The results appear, once more, to outline the importance of doctors in relation the quality of the service provided. As shown in Table 4 Panel B, if we move from the 25th to the 75th percentile of the sample distribution, which corresponds to a growth of roughly 10% in the share of doctors on the board, there is an improvement in the predicted probability to achieve the maximum rating of 7.34%. Likewise, increasing by 10% the presence of directors with a medical background considerably reduces the likelihood to receive the lower ratings of one or two. This improvement through an increasing number of doctors on boards is statistically higher than the possible impact of all other variables.

Sensitivity analyses

In order to test the reliability of the findings two groups of robustness tests were run. The first test was performed by using an alternative indicator of quality, namely, the HSMR. As we explained earlier, this is deemed to be a measure of care and treatment quality related to outcomes rather than just to outputs/processes. The mortality ratios had only a 16% level of correlation with the HC quality. As showed in Table 5, the analysis (which was run by using linear regression via OLS and, thus, regressing the negative values of HSMRs – a continuous variable – with the explanatory and control variables) confirmed the positive and significant association between the share of clinicians and the quality of the health care provided. Crucially, this positive and significant relationship seems to be explained by the ratio of doctors on the boards in all the specifications of the model. By contrast, the percentage of nurses and other health allied professions on boards is statistically significant only in some specifications.

A second group of robustness tests sought to rule out the possibility that the results were driven by endogeneity problems due to reverse causality. Here the concern is that doctors are not driving performance improvements but are being recruited onto the boards of hospital trusts that are already successful. To this end, initially the analysis was re-run using lag values of the independent variables employed. For instance, the pooled regressions were re-run using the year 2008/9 for the dependent variable and employing the values related to the year 2007/8 for the explanatory and control variables. Due to the nature of the dataset, this led to a reduced number of observations – from 240 to 138 – when running the robustness tests. Essentially, the assumption behind this test is that doctors are not able to predict the ratings at time t from the information set available at time $t-1$, thus suggesting that ratings (at time t) are *not* explained by the tendency of clinicians to join the boards of already successful trusts.

We also included an additional control variable measuring the continuity, reduction or increase (essentially the difference) in the percentage of doctors in the respective year over the prior year.

Table 3
Does the share/typology of clinicians on the board influence the quality of services?

	Dependent variable: quality rating									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CLINICAL	3.081**	3.114*	3.041*	2.704						
	(1.564)	(1.636)	(1.656)	(1.702)						
DOCTORS					3.763**	4.447**	4.264**	3.930*	3.846*	
					(1.872)	(1.908)	(1.925)	(2.211)	(2.206)	
OTHERCL					2.032	1.177	1.215	1.027		0.579
					(2.254)	(2.245)	(2.342)	(2.336)		(2.335)
CEOBACK	−0.075	0.003	−0.004	0.176						
	(0.355)	(0.369)	(0.379)	(0.382)						
CEOBACK_DOC					−0.049	0.052	0.021	0.199	0.216	0.524
					(0.400)	(0.421)	(0.447)	(0.481)	(0.476)	(0.434)
CEOBACK_OTH					−0.056	0.045	0.058	0.263	0.379	0.336
					(0.492)	(0.484)	(0.488)	(0.456)	(0.397)	(0.447)
BOARDSIZE	1.129	1.607	1.644	0.851	1.078	1.555	1.620	0.845	0.812	0.487
	(1.116)	(1.150)	(1.153)	(1.155)	(1.099)	(1.134)	(1.137)	(1.163)	(1.143)	(1.129)
INDEPENDENT	3.148	3.227	3.078	1.443	3.092	3.102	2.958	1.346	1.265	1.390
	(2.438)	(2.468)	(2.489)	(2.597)	(2.508)	(2.510)	(2.516)	(2.617)	(2.555)	(2.654)
GENDER	0.304	0.084	0.071	0.210	0.387	0.238	0.217	0.355	0.389	0.152
	(1.053)	(1.055)	(1.068)	(1.074)	(1.068)	(1.062)	(1.074)	(1.074)	(1.079)	(1.048)
ATURNOVER		−0.006**	−0.005*	−0.005*		−0.007**	−0.007**	−0.006**	−0.006**	−0.004
		(0.003)	(0.003)	(0.003)		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
SIZE		−0.392	−0.408	−0.293		−0.424*	−0.435*	−0.397	−0.433	−0.302
		(0.251)	(0.258)	(0.318)		(0.248)	(0.255)	(0.356)	(0.342)	(0.356)
MEANAGE				0.095				0.034	0.023	0.146
				(0.195)				(0.216)	(0.214)	(0.203)
POPSERVED				−0.004				−0.001	0.001	−0.000
				(0.017)				(0.018)	(0.018)	(0.018)
FOUNDATION				0.778*				0.771*	0.771*	0.777*
				(0.422)				(0.420)	(0.418)	(0.418)
TEACHING				0.133				0.164	0.189	0.216
				(0.306)				(0.314)	(0.307)	(0.316)
Pseudo *R*-squared	0.013	0.025	0.039	0.047	0.014	0.026	0.037	0.049	0.048	0.043
Year dummies	No	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Observations	240	240	240	240	240	240	240	240	240	240

Period: 2006/7–2008/9.
Robust standard errors clustered at the hospital trust level in parentheses.
**$p < 0.05$, *$p < 0.1$.

This variable serves as a further partial proxy for the lagged effect of the percentage of doctors on the quality rating. The results confirmed the direction of causality (Appendix A), namely that it is medical involvement on boards which is having positive consequences for quality rather that the reverse case. The validity of this assumption was further reiterated when we checked for the possibility of autocorrelation between the ratings of hospital trusts; that is, the possibility that the ratings would not change significantly between subsequent years giving potential directors the chance to correctly predict the rating achieved by the organisation. The test revealed low levels of autocorrelation (39%).

Next, the reverse causality problem was controlled for by estimating a linear regression via two-stage least squares instrumental variables. Specifically, the percentage of doctors was modelled as an endogenous covariate which is instrumented through two exogenous variables: the background of the CEO and the log value of the population served. These two variables were highly positively correlated with the percentage of doctors on the boards (above 30%) but, as discussed in the previous sections, they do not influence the quality rating. Notably, the validity of these instruments is also confirmed by the Sargan test of over-identifying restrictions, which is not significant at customary levels. The predicted values of the percentage of doctors obtained from the first stage regression were then employed as an explanatory variable in the regression on the determinants of quality ratings. This further analysis, which provided comparable results, supported our main finding that the presence of doctor directors on boards positively influences the rating achieved.

For the sake of simplicity and brevity, we have not reported the findings for some of the control variables employed. Accordingly,

Table 4
Predicted probabilities of obtaining a quality rating of a given class.

	Pr (QRATING = 1)	Pr (QRATING = 2)	Pr (QRATING = 3)	Pr (QRATING = 4)
Panel A: Predicted probabilities of obtaining a quality rating				
Mean	3.33	14.00	48.88	33.86
Median	2.65	12.45	50.71	33.25
Standard deviation	2.45	6.90	6.38	13.44
Panel B: Predicted probabilities (%) for different values of doctors				
DOCTORS = 8.33%	4.38	18.66	54.12	22.84
DOCTORS = 18.18%	3.04	13.97	52.81	30.18
ΔProbability	−1.34	−4.69	−1.31	7.34

Based on model in Table 3, column 9.
Changes in probability based on a change in the % of doctors equivalent to a move from the 25th to the 75th of the sample distribution (roughly equivalent to 10%).

Table 5
Does the share/typology of clinicians on the board influence the mortality ratios?

	Dependent variable: HSMRs									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CLINICAL	73.364***	67.782***	67.973***	46.744***						
	(21.007)	(19.051)	(19.044)	(17.560)						
DOCTORS					85.733***	80.714***	79.941***	62.079**	60.594**	
					(26.725)	(23.747)	(23.798)	(24.004)	(24.156)	
OTHERCL					43.036	39.973	42.103	20.249		12.788
					(27.103)	(25.916)	(26.119)	(22.131)		(18.659)
CEOBACK	−8.522*	−7.440*	−7.363*	−5.851						
	(4.383)	(4.409)	(4.410)	(4.337)						
CEOBACK_DOC					−11.329*	−9.750	−9.525	−6.860	−6.572	−1.855
					(5.715)	(5.928)	(5.888)	(4.853)	(4.770)	(4.064)
CEOBACK_OTH					−3.605	−3.277	−3.500	−2.844	−0.484	−1.652
					(5.549)	(5.424)	(5.534)	(6.341)	(5.542)	(5.882)
BOARDSIZE	12.750	19.598**	19.512**	13.936	14.185	20.549**	20.418**	14.529*	13.943	9.490
	(8.172)	(8.580)	(8.548)	(8.500)	(8.677)	(8.467)	(8.468)	(8.400)	(8.407)	(8.731)
INDEPENDENT	−2.301	2.828	2.481	1.858	−4.588	0.200	0.036	0.172	−0.543	2.568
	(20.211)	(21.104)	(21.199)	(22.294)	(20.181)	(20.971)	(21.150)	(21.933)	(21.953)	(19.798)
GENDER	−12.863	−18.166	−19.052	−10.822	−11.570	−16.579	−17.466	−8.968	−8.292	−12.178
	(12.778)	(11.812)	(11.970)	(9.050)	(13.509)	(11.905)	(12.120)	(8.934)	(8.789)	(7.574)
ATURNOVER		0.016	0.019	0.041		0.006	0.009	0.029	0.028	0.064
		(0.091)	(0.092)	(0.064)		(0.087)	(0.088)	(0.059)	(0.058)	(0.061)
SIZE		−5.674	−5.673	−4.543		−5.553	−5.561	−5.467	−5.878	−4.239
		(4.728)	(4.748)	(4.108)		(4.824)	(4.840)	(4.327)	(4.222)	(3.629)
MEANAGE				0.745**				0.774**	0.799**	0.792***
				(0.352)				(0.353)	(0.351)	(0.275)
POPSERVED				3.302				2.569	2.390	4.272*
				(3.001)				(3.241)	(3.249)	(2.288)
FOUNDATION				−3.059				−3.234	−3.256	−2.725
				(3.751)				(3.781)	(3.780)	(2.673)
TEACHING				4.888				5.210*	5.633*	6.190***
				(3.195)				(3.088)	(3.060)	(2.180)
CONSTANT	−139.958***	−121.382***	−119.844***	−170.108***	−141.192***	−121.774***	−120.205***	−160.842***	−154.508***	−162.208***
	(24.087)	(32.860)	(32.799)	(43.066)	(23.756)	(33.638)	(33.530)	(43.857)	(42.950)	(43.058)
Ad *R*-squared	0.098	0.121	0.119	0.230	0.101	0.123	0.120	0.232	0.232	0.191
Year dummies	NO	NO	YES	YES	NO	NO	YES	YES	YES	YES
Observations	237	237	237	237	237	237	237	237	237	237

Period: 2006/7–2008/9.
Robust standard errors clustered at the hospital trust level in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

these were not found to be significant determinant of the quality rating achieved by hospital trusts. Only the case-load appears to have a significantly negative impact on the HSMR measure and to affect the significance of the relationship between share of clinicians and quality rating. Nevertheless, this is not unexpected as an 'un-manageable' number of admissions is intuitively going to affect the quality of the care and treatment provided.

Concluding discussion

The findings reported above have potentially wide-ranging implications for research and policy. At a most basic level they indicate that only limited progress has been made in recruiting clinicians onto the boards of NHS hospital trusts, a conclusion also borne out by other research (Dorgan et al., 2010; King's Fund, 2011). However, at the same time, the impact of clinician board members in the NHS appears to be considerable. Our analysis suggests that even a small increase in the number of doctors on boards (10%) can have marked consequences for hospital level outputs and outcomes. Indeed, the results suggest that clinical involvement can have a positive influence on performance, with this underlying relationship continuing to hold even when various controls are included in the model.

As such the findings lend support for much of the research previously conducted on the dynamics of hospital boards (Goodall, 2011; Jiang et al., 2009; Prybil, 2006b). However, at the same time, they also advance this work. First is by extending the scope of research to a health system (the NHS) outside the US where corporate style boards are a more recent innovation. Second, by including data over a three-year period, our results give a much clearer indication of the direction of influence. Indeed, they suggest that it is clinical involvement on boards that is contributing to performance and not the reverse case (in which high performing trusts recruit more clinicians at senior levels).

A related advance is to focus on the impact of the human capital of *all* clinicians on boards. Notwithstanding the importance of nursing in the delivery of care services (Prybil, 2006b), our study finds that the influence of nurse directors on performance was negligible. The results also suggest that the qualifications of the CEO may be less important than previously assumed (see Goodall, 2011). Instead, what appears to count for more is having a larger group of clinicians on boards collectively contributing to decision making. Although caution is required here – given the small number of clinician CEOs in our sample – this finding does provide support to the argument that 'heroic' leadership by individuals may be less important than leadership that is 'distributed' (King's Fund, 2012).

From the data it is not clear why the presence of doctors on NHS boards is having these effects, although one might argue that it has much to do with 'increased understanding and credibility and better communication' (Dorgan et al., 2010, p. 14). Concerning understanding, there are likely to be significant 'informational advantages' (Molinari, Morlock, Alexander, & Lyles, 1993, p. 361) associated with having clinical experts shape strategic decisions. As

Weiner et al. (1997, p.456) suggest 'physician leaders can shape the hospital's quality vision and directly influence decisions about implementation and cost-quality trade-offs'. These leaders could also promote new innovations in the design of services – for example, around care pathways or the translation of new knowledge into practice (Waring & Currie, 2009). In the NHS, hospital trusts have been required to focus on a much wider set of performance targets beyond financial efficiency. Boards are also now directly accountable for clinical governance, an area where one might expect the input of doctors and nurses to be critical (Healthcare Commission, 2009).

The legitimacy and credibility of clinical board members will also be important here. Arguably clinicians are better placed to leverage support for new policies amongst their colleagues, therefore improving the likelihood that changes will be accepted and implemented. According to Succi and Alexander (1999, p. 34) 'physician executives/board members have the ability to bridge the diverse cultures, interests, and styles of communication that often exist between hospitals and physicians'. Indeed, it is possible that increasing the representation of clinicians in management will help to improve communication and engagement more generally, fostering what Rundall, Davies, and Hodges (2004, p. 267) describe as a 'group culture' or 'team approach to hospital operations'. This representative role of clinical board members should not be underestimated (Ham et al., 2011).

Of course, when drawing these conclusions it is important to note certain caveats and directions for future research. First, more work is needed to understand *why* the presence of clinicians on boards is influencing performance outcomes. This will require more attention to the leadership styles of senior nurses and doctors (Hardacre, Cragg, Flanagan, Spurgeon, & Shapiro, 2010) and to how broader organisational contexts either help or hinder their involvement in strategic decisions (Rundall et al., 2004). A related question is whether available financial and 'slack' resources of hospital trusts (which we were unable to control for) were a factor explaining performance outcomes, independently of clinical input. A second line of enquiry concerns the performance metrics used. A potential limitation of the HC star ratings is that they deal mainly with process measures as opposed to outcomes. More could be done to explore the relationship between clinical leadership and a wider range of outcome measures, such as patient complication rates or general levels of satisfaction. Lastly, there is scope to conduct a more fine-grained analysis of the different kinds of expertise on the board. How important, for example, is the particular medical specialisation and subsequent training of doctors who take on these roles? Also, what about the expertise of non-clinical board members, notably those with business or accounting backgrounds? A central premise of management reforms in the UK is that these private sector skills will enhance the performance of health services (Veronesi & Keasey, 2011), although whether or not this is true remains unclear.

These caveats aside, our findings do have important implications for research and policy. First, they add to the evidence base for clinical leadership, drawing attention to how a greater involvement of doctors in hospital governance in particular may be having positive consequences. In policy terms, this finding reinforces much of the work that has already been set in train following Ara Darzi's review of the NHS in England. If having more doctors in senior decision-making roles is producing benefits then surely more emphasis needs to be placed on training to improve capabilities and on attracting and retaining talent. More could also be done to improve incentives, perhaps by rewarding contributions to leadership at the same level to those of research and academic excellence. It is possible that moves to increase competition and choice for health services in the UK (and elsewhere) will accelerate these changes (see Dorgan et al., 2010), although only time will tell how far that is the case.

Acknowledgements

We would like to thank the editor and the three anonymous reviewers for their many helpful comments. All errors remain ours. We also thank Dr Foster for the access to their proprietary database.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2012.11.019.

References

Addicott, R. (2008). Models of governance and the changing role of the board in the 'modernised' UK health sector. *Journal of Health Organisation and Management, 22*, 147–163.
Bevan, G., & Hood, C. (2006). What's measured is what matters: targets and gaming in the English public health care system. *Public Administration, 84*, 517–538.
Braithwaite, J., & Westbrook, M. (2004). A survey of staff attitudes and comparative managerial and non-managerial views in a clinical directorates. *Health Service Management Research, 17*, 141–166.
Clarke, J. (2006). *More doctors as chief executives – A realistic vision?* (50th Anniversary ed.). Crosscurrents, 14–15.
Degeling, P., Kennedy, J., & Hill, M. (2001). Mediating the cultural boundaries between medicine, nursing and management – the central challenge in hospital reform. *Health Services Management Research, 14*, 36–48.
Department of Health. (2008). *High quality care for all: NHS next stage review final report*. London: Deparment of Health.
Dorgan, S., Layton, D., Bloom, N., Homkes, R., Sadun, R., & Van Reenen, J. (2010). *Management in healthcare: Why good practice really matters*. London: McKinsey and Co. and LSE (CEP).
Edmonstone, J. (2008). Clinical leadership: the elephant in the room. *International Journal of Health Planning and Management, 10*, 290–305.
Farrell, C. M. (2005). Governance in the UK public sector: the involvement of the governing board. *Public Administration, 83*, 89–110.
Ford-Eickhoff, K., Plowman, D. A., & McDaniel, R. R. (2011). Hospital boards and hospital strategic focus: the impact of board involvement in strategic decision making. *Health Care Management Review, 36*, 145–154.
Freidson, E. (1985). The reorganisation of the medical profession. *Medical Care Review, 42*, 11–35.
Goldstein, S. M., & Ward, P. T. (2004). Performance effects of physicians' involvement in hospital strategic decisions. *Journal of Service Research, 6*, 361–372.
Goodall, A. (2011). Physician-leaders and hospital performance: is there an association? *Social Science & Medicine, 73*, 535–539.
Ham, C., Clark, J., & Spurgeon, J. (2011). *Medical leadership: From dark side to centre stage*. London: The King's Fund.
Ham, C., & Dickinson, A. M. (2008). *What can we learn from international experience and research evidence?* London: NHS Institute for Innovation and Improvement.
Hardacre, J., Cragg, R., Flanagan, H., Spurgeon, P., & Shapiro, J. (2010). Exploring links between NHS leadership and improvement. *International Journal of Leadership in Public Services, 6*, 26–38.
Harrison, S., & Ahmad, W. I. U. (2000). Medical autonomy and the UK state 1975 to 2025. *Sociology, 34*, 129–146.
Healthcare Commission. (2008). *The annual health check 2008/2009 – Assessing and rating the NHS*. London: Commission for Healthcare Audit and Inspection.
Healthcare Commission. (2009). *Safe in the knowledge. How do trust boards ensure safe care for patients?* London: Commission for Healthcare Audit and Inspection.
Hunter, D. J. (1992). Doctors as managers: poachers turned gamekeepers? *Social Science & Medicine, 35*, 557–566.
Jiang, H. J., Lockee, C., Bass, K., & Fraser, I. (2009). Board oversight of quality: any differences in process of care and mortality? *Journal of Healthcare Management, 54*, 15–29.
Kelman, S., & Friedman, J. N. (2009). Performance improvement and performance dysfunction: an empirical examination of distortionary impacts of the emergency room wait-time target in the English national health service. *Journal of Public Administration Research and Theory, 19*, 917–946.
King's Fund. (2011). *The future of leadership and management in the NHS: No more heroes*. London: The King's Fund.
King's Fund. (2012). *Leadership and engagement in the NHS for improvement: Together we can*. London: The King's Fund.
Kirkpatrick, I., Jespersen, P. K., Dent, M., & Neogy, I. (2009). Medicine and management in a comparative perspective: the case of Denmark and England. *Sociology of Health & Illness, 31*, 642–658.
Kor, Y. Y., & Sundaramurthy, C. (2009). Experience-based human capital and social capital of outside directors. *Journal of Management, 35*, 981–1006.
Kovner, A. R. (1990). Improving hospital board effectiveness: an update. *Frontiers of Health Services Management, 6*, 3–27.

Kuhlmann, E., & Annandale, E. (2012). Researching transformations in healthcare services and policy in international perspective: an introduction. *Current Sociology, 60*, 401–414.
Lilford, R., & Pronovost, P. (2010). Using hospital mortality rates to judge hospital performance: a bad idea that just won't go away. *British Medical Journal, 340*.
Lister, E. D. (2000). From advocacy to ambassadorship: physician participation in healthcare governance. *Journal of Healthcare Management, 45*, 108–116.
Molinari, C., Morlock, L., Alexander, J., & Lyles, C. A. (1993). Hospital board effectiveness: relationships between governing board composition and hospital financial viability. *Health Services Research, 28*, 358–377.
Murphy, J., Quillinan, B., & Carolan, M. (2009). Role of clinical nurse leadership in improving patient care. *Nursing Management, 16*, 26–28.
Numerato, D., Salvatore, D., & Fattore, G. (2012). The impact of management on medical professionalism: a review. *Sociology of Health & Illness, 34*, 626–644.
Prybil, L. D. (2006a). Characteristics of effective boards. *Trustee, 59*, 20–23, 21.
Prybil, L. D. (2006b). Size, composition, and culture of high-performing hospital boards. *American Journal of Medical Quality, 21*, 224–229.
Rundall, T. G., Davies, H. T. O., & Hodges, C. L. (2004). Doctor-manager relationships in the United States and the United Kingdom. *Journal of Health Care Management, 49*, 251–268.
Salge, T. O. (2011). A behavioral model of innovative search: evidence from public hospital services. *Journal of Public Administration Research and Theory, 21*, 181–210.
Succi, M. J., & Alexander, J. A. (1999). Physician involvement in management and governance: the moderating effects of staff structure and composition. *Health Care Management Review, 24*, 33–44.
Veronesi, G., & Keasey, K. (2011). National health service boards of directors and governance models. *Public Management Review, 13*, 861–885.
Waring, J., & Currie, G. (2009). Managing expert knowledge: organizational challenges and managerial futures for the UK medical profession. *Organization Studies, 30*, 755–778.
Weiner, B. J., Shortell, S. M., & Alexander, J. (1997). Promoting clinical involvement in hospital quality improvement efforts: the effects of top management, board, and physician leadership. *Health Services Research, 32*, 491–510.
Xirasagar, S., Samuels, M. E., & Stoskopf, C. (2005). Physician leadership styles and effectiveness: an empirical study. *Medical Care Research and Review, 62*, 720–740.