Management Practices in Hospitals

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Abstract

We develop a new methodology for measuring management practices in hospitals, and use this in 182 interviews of physicians and managers in public and private hospitals covering 61% of English acute hospitals. We find our management measure is strongly correlated with hospital performance as measured by clinical outcomes (e.g. survival rates from heart attacks) and general operational/ financial outcomes. We then examine why management practices vary across hospitals. We find that product market competition, as proxied by the geographical proximity of other hospitals, is positively associated with better management. We instrument competition with the share of nearby politically marginal constituencies, exploiting the fact that in the UK public hospitals (National Health Service) are rarely closed in politically marginal areas. Management scores in publicly owned hospitals are lower than privately owned hospitals and manufacturing. Among publicly owned hospitals management scores are relatively higher in hospitals with greater autonomy from the government (Foundation Trusts) and where managers have more clinical expertise.

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All over the world, healthcare costs are rising as a proportion of national income. In the UK, for example, healthcare rose from 7.1% of GDP in 2001 to 9.4% in 2006, while in the US this has risen from 14.5% to 16% over the same period, with both projected to rise further (Hall and Jones, 2007). Escalating costs has led to a much greater emphasis on improving productivity in healthcare, especially since a large share of these costs are subsidised by the government.

We know that there are large differences in hospital performance across a wide range of indicators even after extensive controls have been made for differential case mix and hospital inputs (Kessler and McLennan, 2000; Hall et al, 2008). This is not surprising – there is a huge variability in productivity in many other areas of the private and public sector (e.g. Foster, Haltiwanger and Syverson, 2008). Commentators have long believed that these performance differences were at least in part linked to management practices, but the main evidence for this belief resides in anecdote and from case studies rather than systematic quantitative evidence.

In recent work we have pioneered a methodology for quantifying management practices and implemented this survey tool on thousands of manufacturing firms in Europe, Asia and the US (Bloom and Van Reenen, 2007; Bloom et al, 2007). The measures proved very robust to measurement error and our management scores were strongly correlated with firm performance. The manufacturing sector is a declining share of employment and GDP for developed nations, however, so a legitimate question is whether the survey tool can also be used in other sectors. In this paper we apply the same basic methodology to measuring management in the healthcare sector. We implement our methods in 161 interviews across 100 English acute hospital trusts interviewing a mixture of clinicians and managers in two specialities: cardiology and orthopaedics. On top of that, 21 private sector hospitals were also interviewed using the same methodology. We cover 61% of all providers of acute care in the UK.

Our results are both methodological and substantive. On the methodological front, we show that our management practice scores deliver useful information and are correlated with measures of hospital performance such as lower mortality rates from AMI[1] and general surgery, waiting lists, staff

[1] Acute myocardial infarction, commonly known as a “heart attacks”.

turnover and composite measures of performance.[2] On the substantive front we uncover several interesting findings.

First, the average scores of management are lower in public hospitals than for manufacturing. This is primarily due to different "people" management practices, which include hiring, firing, promotions, rewards and recruitment. But it also arises in the management in of targets, where NHS hospitals have many, most of which are arbitrarily imposed by central government (Smith, 2002; Jacobs et al, 2006).

Second, we find evidence that competition appears to lead to better hospital management. We measure hospital competition as the number of hospitals in the catchment area, and instrument this with the number of marginal political constituencies within the same catchment area. In the UK hospital opening and closures are centrally determined by the Department of Health (the Health Ministry). These decisions are extremely politically sensitive given the importance of hospitals to local communities, so that hospitals are almost never closed in marginal political constituencies. As a result, all else equal, there tend to be a greater number of hospitals in marginal constituencies. Using this political instrument for hospital numbers we find a significant positive impact of greater local hospital competition with management practices. This is robust for a variety of other controls for local population density, case-mix, demographics and overall vote shares.

Third, average management scores are lower in public than in private hospitals, with again this gap primarily due to people management. These differences between government and non-government hospitals are consistent with Duggan (2000) who finds large differences in behaviour of government and non-government owned hospitals in US data[3].

Finally, we find that when managers have clinical qualifications and when key decisions are made jointly between managers and clinicians, average management scores are significantly higher. This suggests that the asymmetry of information between managers and the powerful interests of senior physicians is a key factor that leads to lower performance. This finding also accords with moves to

[2] This is also consistent with McConnell et al. (2009) who use the Bloom and Van Reenen (2007) methodology to collect management data on 147 US addiction treatment programs, finding a positive management performance relationship.
[3] Duggan (2000) shows that for-profit and not for profit hospitals behaved in a similar way when faced with a large change in financial incentives to treat low income patients (i.e. they were much more responsive than government hospitals and tended to cream skim the easier to treat, but poorer, patients). This is consistent with the survey in Sloan (2000).

improve hospital performance through greater integration of clinicians into management in hospitals in the US, Holland, Sweden and more recently the UK[4].

The structure of the paper is as follows. The next section discusses the data, Section II describes the relationship between performance and management and Section III contrasts public healthcare with private healthcare and other sectors in the UK and internationally. Section IV describes the factors that are strongly associated with management in the public health sector. Section V offers some concluding comments.

I. DATA

The data used for the analysis is drawn from three different sources: the management survey conducted by the Centre for Economic Performance (CEP) at the London School of Economics, which includes 18 questions from which the overall management source is computed plus additional information about the process of the interview and features of the hospitals. This is complemented by external data from the UK Department of Health, which provides information on many hospital characteristics such as clinical outcomes, patient case mix, size and measures relating to the quality and efficiency of treatment.

I.A. Management Survey Data

The core of this dataset is made up of 18 questions which can be grouped in the following four subcategories: operations (3 questions), monitoring (3 questions), targets (5 questions) and people management (7 questions). For each one of the questions the interviewer reports a score between 1 and 5, a higher score indicating a better performance in the particular category. Table B2 shows descriptive statistics for all individual questions and averages for the subcategories. The last two columns report the equivalent score from the manufacturing sample and the difference between the

[4] In the UK the Department of Health (2008) recommended a clinical voice at every level of the service, and investment in new programmes of clinical leadership. It also announced the government's intention to foster the development of Academic Health Science Centres to integrate research, education and health services.

average scores for manufacturing firms and hospitals.[5] A detailed description of the individual questions and the scoring method is provided in Appendix A.[6]

A key challenge in evaluating these management questions is to obtain unbiased responses. To try to do this we used a *double-blind* survey methodology. The first part of this was that the interview was conducted by telephone without telling the respondents that they were being scored. This enabled scoring to be based on the interviewer's evaluation of the hospital's actual practices, rather than their aspirations, the respondent's perceptions or the interviewer's impressions. To run this "blind" scoring we used open questions (i.e. "can you tell me how you promote your employees"), rather than closed questions (i.e. "do you promote your employees on tenure [yes/no]?"). Furthermore, these questions target actual practices and examples, with the discussion continuing until the interviewer can make an accurate assessment of the hospital's typical practices based on these examples. For each practice, the first question is broad with detailed follow-up questions to fine-tune the scoring. For example, in dimension (1) *Layout of patient flow* the initial question is "Can you briefly describe the patient journey or flow for a typical episode?" is followed up by questions like "How closely located are wards, theatres, diagnostics centres and consumables?"

The second part of the *double-blind* scoring methodology was that the interviewers did not know anything about the hospital's performance in advance of the interview. The interviewers were specially trained graduate students from top European and U.S. business schools. Since each interviewer also ran 46 interviews on average we can also remove interviewer fixed effects in the regression analysis.

The survey also includes questions on other features of the hospital such as number of managers with a clinical or managerial degree and the number of sites. Whenever these variables can more reliably be obtained from the external dataset (see below) we cross check results against this source as well. We also have some more qualitative variables such as the way decisions are made within the hospital. This measure of joint decision-making (between clinicians and managers) is available for the allocation of work within the hospital and also the development of the hospital's business plan.

[5] There are 16 questions in the manufacturing survey, which overlap with the hospital survey. Therefore the comparison is only possible for these 16 questions. The manufacturing sample includes all firms based in the UK, including multinationals.

[6] The questions in appendix A correspond in the following way to these categories. Operations: question 1-3, Monitoring: question 4-6, Targets: question 8-12, People management: question 7 and 13-18.

Finally, we also collected a set of variables that describe the process of the interview, which can be used as "noise controls" in the econometric analysis. The variables collected included: an interviewer fixed effect, the time of the day and date of the interview, the duration of the interview, the position of the interviewee (clinician or manager), the speciality in which he is located (cardiology or orthopaedics) and a reliability index coded by the interviewer. The interviewee's tenure in the post and in the trust is also reported. Including these "noise controls" helps reduce residual variation.

Obtaining interviews with managers was facilitated by the endorsement of the Department of Health, and the name of the London School of Economics, which is well known in the UK as an independent research university. This strong government and academic endorsement enabled us to interview respondents for an average of just under an hour.

I.B. External Data

In the manufacturing sector economists generally use labour or total factor productivity as a measure of organizational performance. In the case of hospitals it is more difficult to measure output, particularly where patients do not pay directly for their care and standard productivity measures are therefore not available. It is not straightforward to develop a single summary measure of hospital performance and data restrictions limit the indicators that are available on a consistent cross-hospital basis. As the main goal of hospitals is to improve its patients' health, variables capturing the success of treatment such as mortality rates are a natural candidate. Another possibility is to use a broader measure that also takes financial efficiency, resource use and other factors into account. Hospital regulators in the USA and the UK use a wide range of measures in their attempts to assess hospital performance[7]. The sources of these are detailed in Appendix Table B1.

We therefore examine the correlation of each of a number of clinical and non-clinical performance measures with the management score. The key clinical outcomes we use are the 28 day mortality rate for non-elective (i.e. emergency) admissions for (i) AMI (acute myocardial infarction)[8] and (ii)

[7] See for example http://2008ratings.healthcarecommission.org.uk/informationabouthealthcareservices.cfm

[8] Examples of the use of AMI death rates to proxy hospital quality include Kessler and McClellan (2000), Gaynor (2004) and, for the UK, Propper et al (2004).

non-elective surgery[9]. We choose these for three reasons. First, regulators in both the USA and the UK use selected death rates as part of a broader set of measures of hospital quality. Second, using emergency admissions helps to reduce selection bias because elective cases may be non-randomly sorted towards hospitals. Third, death rates are well recorded and cannot be "gamed" by administrators trying to hit targets. Fourth, heart attacks and overall emergency surgery are the two most common reasons for admissions that lead to deaths.

We also use MRSA infection rates ("superbugs") as a further quality measure for the hospital. We also use a measure of access to care, for which we use the size of the waiting list for all operations. Long waits have been an endemic problem of the UK NHS; although these have fallen dramatically over the last 8 years (see Propper et al, 2008b). Again, both of these measures have been used by the UK government to rate English NHS hospitals.

These indicators have the disadvantage that each individual measure is rather noisy so aggregating into a summary hospital performance score is desirable. There is an element of subjectivity in deciding what set of performance metrics to use and what weight to put on each individual metric. To avoid any concern that we are choosing these arbitrarily, we use the UK Government's Health Care Commission ratings which represent such a composite performance measure. The Health Care Commission currently rates hospitals along two dimensions of "resource use" and "quality of service" (measured on a scale from 1 to 4). The efficiency of resource use is measured by the number of spells per medical employee, bed occupancy rate and the average length of stay. Service quality is measured by clinical outcomes (readmission risk and infection rates), waiting times and a measure of patient satisfaction as well as job satisfaction of the staff. We use the 2006 values as these are coincident with the timing of the survey and average across the two measures (which are on a scale of 1 to 4). These ratings replaced the HCC's single "star rating" (on a scale of 1 to 3). The HCC does not reveal the exact formula it uses to aggregate over the components of the index, but some averaging is valuable due to the noisiness of the underlying performance measures. We also report experiments where we disaggregate the index and construct our own (re-aggregated) index.

[9] Death rates following emergency admission were used by the UK regulator responsible for health quality in 2001/2 http://www.performance.doh.gov.uk/performanceratings/2002/tech_index_trusts.html

We also collected data on total employment, the number of doctors, beds, speciality, location etc. as additional control variables. The descriptive statistics for some of the most important variables, which will be used later on, can be found in Table 1. The mortality rate from AMI is 17%, although there is considerable variation (e.g. Hall et al, 2008). It is lower for emergency surgery cases. A typical hospital trust has 3,651 staff, 387 medical full-time equivalents (physicians) and 15,513 patient-cases per quarter. NHS trusts are larger than many US hospital and a typical trust is multi-site (2.6 on average).

I.C Descriptive Statistics

We approached up to four individuals in every hospital – a manager and physician in the cardiology service and a manager and clinician in the orthopaedic service. There were 164 acute hospital trusts with orthopaedics or cardiology departments in England and 61% of hospitals (100) responded which is a very high hit rate for a voluntary survey. We obtained 161 interviews, 79% of which were with managers (it was harder to obtain interviews with physicians). The responses between the two service lines were evenly split. Furthermore, we show that response probability was uncorrelated with observables such as performance outcomes, size and composition (Appendix B). We also ran a smaller scale survey asking identical questions to private hospitals and collected information on 21 of these. Again, we could find no systematic response bias, although the number of observables for private hospitals is much smaller (we have only size as measured by number of beds and area).

I.D. Preliminary Data Analysis

Before any econometric estimation we first present some simple descriptive statistics. As with the manufacturing sector (see Bloom and Van Reenen, 2007) the management questions are all highly correlated together, so we will usually aggregate the questions together either by taking the simple average (as in the figures) or by z-scoring each individual question and then taking the z-score of the average across all questions (in the regressions)[10].

In Figure 1 we present the non-parametric plot of the relationship between the HCC average rating and the management practice score. There appears to be a positive correlation between the two variables, suggesting that the management responses are not simply "cheap talk". Figure 2 presents a

[10] Factor analysis confirms that there is one dominant factor that loads heavily and positively on all questions. As with the earlier work, there is a second factor that loads positively on the people management questions, but negatively on the monitoring/operations questions. This suggests that there is some specialization across hospitals in different forms of management.

similar graph, cut slightly differently. We divide the HCC score into quintiles and show the average management score in each bin. There is a clear upward sloping relationship: management scores in the lowest quintiles are 2.3 and 2.4., in the next two quintiles they are between 2.5 and 2.6 and in the highest quintile they are 2.8.

Figure 3 plots the entire distribution of management scores for our respondents (in the upper Panel A). There is a large variance with some well managed firms, and other very poorly managed. It is striking that there are few hospitals which scores above a 4. In Panel B we present a comparison between hospitals and UK manufacturing firms. To make the samples somewhat comparable we keep only establishments who have between 50 and 5000 employees and who are domestically owned (i.e. we drop multinationals from the manufacturing sample). Furthermore, in both panels we are using the average management score from only the comparable 16 questions, because two questions on lean management are difficult to compare across sectors.[11] Hospitals clearly have lower management scores than manufacturing firms. Table B2 shows that this is particularly true of people management and targets. We will investigate this in more detail in Section III below.

II HOSPITAL PERFORMANCE AND MANAGEMENT PRACTICES

Before examining the factors "driving" management practices we will first check that the management score is robustly correlated with external performance measures. This is not supposed to imply any kind of causality. Instead, it merely serves as an "external validity" check to see whether a higher management score is correlated with a better performance.

We estimate regressions of the form:

$$y_i^k = \alpha M_{ij} + \beta' x_{ij} + u_{ij}$$

where y_i^k is performance outcome k (e.g. AMI mortality) in hospital i, M_{ij} is the average management score of respondent j in hospital i, x_{ij} is a vector of controls and u_{ij} the error term. Since errors are correlated across respondents within hospitals we cluster our standard errors at the hospital level (they are also robust to heteroscedacity)[12]. We present the performance and

[11] The questions we dropped are 1 and 2 in Appendix A.
[12] Furthermore we weight the observations with the inverse of the number of interviews conducted at each hospital. This gives equal weight to each hospital in the regressions.

management measures in z-scores so the tables can be read as the association of a one standard deviation of management on the outcome (all results are robust to this normalization). We consider disaggregating the 18 questions below, but our standard results simply z-score each individual question, average these into a composite and then z-score this average. In terms of timing, we use the 2005/6 average outcomes in the year to be consistent with the management survey[13].

An important control for the outcomes is the casemix of the patients. We use casemix adjustments standard for the clinical condition we examine. We have the age/gender profile[14] of all admissions for each type of condition (e.g. the demographic profile of patients admitted with AMI in hospital *i* in a given year). In all regressions we also control for the mortality rates in the hospital's "catchment area" to reflect the fact that worse outcomes are likely if the hospital is located in a community with a high rate of ill health (e.g. many old people or high poverty rates).

The other control variables can be grouped into "general controls" and "noise controls". The general controls contain regional dummies (10), a dummy for whether the speciality is in cardiology or orthopaedics, a size proxy (the total number of patient cases at the hospital level)[15]. Noise controls comprise interviewer dummies (4), interview characteristics (duration of the interview and the number of management questions not answered) and interviewee characteristics (tenure, whether the respondent was a clinician or manager). [16]

Table 2 shows results for regressions of each of the performance measured on the standardized management score. The management score is the top panel calculated as the average of 16 out of the 18 questions in the survey excluding the operations questions.[17] The bottom panel shows results based on all 18 questions. The first thing to note, looking at the first row of the table is that higher

[13] We also used longer time averages going back to 2001 in an effort to assess the importance of transitory measurement error. The qualitative results were similar, but actually tended to weaken as we used years further away from the date of the management survey.

[14] Specifically we have 11 age categories for each gender (0-15, 16-45, 46-50, 51-55, 56-60, 61-65, 66-70, 71-75, 76-80, 81-85, >85), so up to 22 controls. These are specific to the conditions (AMI, surgery, etc.) considered. For the general performance indicators (like HCC rating) we use all patients admitted.

[15] We also experimented with a number of other size controls such as total employment, the number of sites in the trust, the number of acute beds and the number of medical FTEs. These gave similar results to using patient-cases.

[16] In order to avoid losing many observations whenever a control variable was missing, we replace the missing value with the mean value of the variable and generate a dummy variable equal to unity for the missing observation. This is included in the regression together with the modified original variable. The results are robust to dropping the missing values.

[17] In Figure 3 and Table 4 we use a pooled sample of the hospital and a manufacturing sector survey. The two surveys are comparable for all but the two operations questions, so these have to be excluded.

management scores are associated with better hospital outcomes across all the measures and this relationship is significant in every case except for MRSA infection rates. This immediately suggests our measure of management is not simply cheap talk, but has informational content.

In the first column of Table 2 the AMI mortality rate is regressed on the management score controlling for a wide number of confounding influences[18]. As is standard we drop observations where the number of cases admitted for AMI is low because this leads to large swings in observed mortality rates[19]. High management scores are associated with significantly lower mortality rates from AMI: a one standard deviation increase in the management score is associated with just under 0.1 of a standard deviation fall in AMI mortality. Columns (2) and (3) examine death rates from different types of surgery (the second column is all surgery following an emergency admission and the third column is a sub-set of this, general surgery following an emergency admission, which is more risky). In both cases there is a significant correlation, although the point estimate is larger in column (3). Columns (4) and (5) use waiting list indicators as measures of poor hospital performance. These are access to care measures rather than health outcomes, but are closely related, as they measure how long it takes to receive a potentially health improving treatment. Better managed hospitals tend to have significantly lower waiting lists and are less likely to breach the waiting list targets imposed by the government. Column (6) presents the MRSA infection rate, another measurement of health outcomes. The coefficient is correctly signed but insignificant.

A concern with the management measures is that they might be associated with higher efficiency at the expense of poorer quality of the work environment. To examine this we use data from the NHS Staff Survey which asks all employees whether they intended to leave the hospital in the next year. We use the average of this measure across all workers in the hospital in column (7) as another performance outcome. Higher management scores are associated with a lower probability of wanting to exit the hospital.

The final columns use ratings by the Health Care Commission (HCC) of English hospitals. We average the HCC's rating on "resource use" and "quality of service" in column (8). We also compute a "pseudo HCC rating" by attempting to reverse engineer the process by which the original

[18] Controlling for case mix is particularly important. Without controls for casemix the coefficient is positive and insignificant. This suggests the better managed hospitals are actually taking on more of the complex high risk cases.
[19] Following Hall, Propper and Van Reenen (2008) we drop hospitals with under 150 cases of AMI per year. The results are not sensitive to the exact threshold.

rating was calculated (see Data Appendix B) in column (9). The management practice score is significantly and positively correlated with both of these measures. When using the individual components of the "pseudo-rating" as dependent variables in the regression although the coefficient on management is always of the "correct" sign, only two components are significant at the 5% level: waiting times and staff job satisfaction. Averaging over different outcome variables increases the significance of the right hand side variables which suggests that averaging helps mitigate measurement error[20].

The lower row of Table 2 repeats the exercise over all 18 questions with very similar results. Overall, the Table 2 is reassuring in that our measure of management practices is associated with superior hospital outcomes across a wide range of performance indicators[21].

III MANAGEMENT PRACTICES AND HOSPITAL COMPETITION

One reason for the large variation in management practices across hospitals seen in Figure 3 is a wide variation in levels of competition. There is an extensive discussion surrounding competition and performance in healthcare and other sectors suggesting higher levels of competition is associated with superior management practices (e.g. Fabrizio, Rose and Wolfram 2009; Kessler and McClellan, 2000; Nickell, 1996). We start in Column (1) of Table 3 looking at one measure of competition - the number of competing hospitals in the local area, defined as a 30km radius (about one hour's drive) around the hospital[22]. We find in Column (1) that hospitals with higher numbers of local competing hospitals are assessed as having better management practices.

Of course the number of local hospitals might be endogenous so we instrument this with the number of local political constituencies which are marginal. In the UK closing down a local public (NHS)

[20] We also examined decomposing the management score. When regressing them individually on the HCC rating 11 questions out of 18 questions are significant at the 10% level (11 of them are significant at the 5% level and 4 are significant at the 1% level). When regressing the averages of the four subcategories operations, monitoring, targets and people management individually on the HCC rating we obtain significant coefficients at the 1% level in all cases but the operations category. If all four variables are regressed on the HCC rating only the incentive questions are significant (at the 10% level).

21 We also looked at the effect of the different subcategories of the management score (operations, monitoring, targets and people). The management score based only on the subset questions belonging to a particular category was regressed on different health outcomes using the same regressions as above. Overall "target" and "people" questions have the most explanatory power for the different health outcomes followed closely by the "monitoring" category of questions.

[22] We use the number of public hospitals, because we do not have a valid instrument for private hospitals. We also examined other competition measures such as wider "markets" than 30km and the manager's perceived level of competition. These were highly correlated with this measure and led to similar findings so we do not report the results.

hospital is extremely unpopular. Since these decisions are taken by the Minister of Health, a London-based politician, hospitals are almost never closed in politically marginal constituencies. The reason is that the typical hospital in the UK admits about 40,000 patients a year while the typical constituency has about 50,000 voters. So the closure of a hospital in a marginal constituency is likely to lead the Government to lose that constituency in the next election. In other constituencies where the Government has a large lead over (or lag behind) opposition parties there are no such incentives to avoid hospital closures, as changes of a few percentage points in voting will not alter parliamentary outcomes given the "first past the post" electoral system.[23] We exploit this combination of public hospitals, central controlled hospital closures to generate a natural experiment for hospital numbers.

We create an instrument which is the share of Labour marginal constituencies from the 1997 election (constituencies where Labour won, but by less than 5%) within 30km of the hospital. We use Labour marginals since the Labour party has been in power since 1997 (this was their first election under Tony Blair). We chose 5% as the cut-off for marginals as the size of electoral shift that could happen after a local hospital closure.[24]

We see in Column (2) that the share of local marginal constituencies is extremely significant in explaining hospitals numbers, even after controlling for regional population (a proxy for urbanization), demographics (age and gender profile) and total Labour vote share. Having 10% more marginal constituencies in the vicinity of a hospital leads to about 4 more local hospitals. Note that the share of Labour votes does not have any significant effect on hospital numbers, but being a marginal constituency does. In Column (3) we look at the second stage effect of the number of competing local hospitals on management practices and find a large significant positive effect. Increasing the number of local hospitals by one leads to a 0.353 increase in management scores - about 40% of a standard deviation in management practices. In Column (4) we add higher order controls for Labour's vote share to make sure it really is being a marginal that is driving the number

[23] Britain's "first past the post" system means that the party with the highest vote share in each constituency wins that constituency. In a proportional representation political system this incentive to keep hospitals open in marginal constituencies does not operate as Governments care more about total votes.

[24] We found results robust to using a 7% cut-off and also using a larger radius of 40km. A smaller radius and a smaller threshold for marginality still produces the same qualitative results, but the relevant coefficients are not significant anymore. The problem is that both things increase the number of hospitals that do not have *any* marginal constituency nearby. This reduces the variation from which we can identify the coefficient on competition and therefore makes the estimates less precise.

of hospitals, and find the results are robust. In Column (5) we take out the direct control for Labour vote share as another robustness test and find the results remain significant.

An interpretation of Table 3 is that competition plays a role in improving management practices. When a General Practitioner (the local gatekeeper for patients) refers a patient to a hospital for treatment she has the flexibility to refer the patient to any local hospital. More local hospitals leads to greater choice for General Practitioners, and so greater competition for hospitals. Another reason may be with more local hospitals CEO performance is more easy to evaluate - yardstick competition in stronger - so that they work harder to improve management practices. Finally, more local hospitals may facilitate the learning of management best practices, if for example hospitals tend to show regional spillovers in better management practices, for example through the labor market.

IV COMPARING MANAGEMENT PRACTICES ACROSS SECTORS

As a next step we compare management practices in the healthcare sector with management in manufacturing firms. We use data from the equivalent survey of management practices in the manufacturing sector (see Bloom and Van Reenen, 2007; Bloom et al, 2007). In order to make the two datasets comparable we only use 16 out of 18 questions. Thus, we have a large manufacturing sample of around 651 firms and 182 hospital interviews (including 21 private sector hospitals).

In column (1) of Table 4 we use only the hospital sample and regress the management score on a dummy for being a private hospital. Even after controlling for size we find that private hospitals are better managed than NHS hospitals. In column (2) we use the hospital and manufacturing sample and regress the management practices score on a dummy for being a hospital, with the manufacturing as the baseline. As suggested in Figure 3 hospitals appear to score significantly worse on management than manufacturing (about half of a standard deviation). In column (3) we add a dummy for privately owned hospitals, which is positive and highly significant. The coefficient on the hospitals dummy becomes more negative in this specification, as the higher management practice score of private hospitals is now separated from the public ones. This indicates our sample of private hospitals scores more highly than manufacturing firms which are also all privately owned in the UK.

The differences between the NHS and private hospitals could arise from many factors. One possibility is that the mix of treatments is very different as UK private hospitals specialize in elective

treatments for which there are long waiting lists in the NHS – they do not have to maintain emergency rooms that must by law accept all patients irrespective of their ability to pay. This may make them intrinsically easier to manage. An alternative explanation is that government control may place many constraints over the ability of hospitals to be effectively managed. We try to shed some light in this in two ways. First, we disaggregate the management questions by sub-groups of "types" and second we look at government controlled firms in the manufacturing sector in other countries.

In columns (4) to (6) we look at the management scores for subcategories of the 16 questions. In column (4) we start by looking at *monitoring* management, which covers questions 4 – 6 in Appendix A, focusing on the collection and use of information. We see that NHS hospitals score significantly lower than manufacturers at monitoring management practices and private hospitals perform significantly better than public ones. In column (5) we find very similar results for the *targets* category (questions 8 - 12). The difference both between hospitals and manufacturing and between public and private hospitals is more pronounced for this category of questions. Finally, when looking at *people management* in column (6), which cover questions 7 and 13 - 18, focusing on hiring, firing, pay and promotions management, we also obtain a negative and significant coefficient for the hospital dummy term. Also, private hospitals again score more highly than public ones. The coefficient on the private hospital dummy is positive and significant and larger than for the other two categories. The low score for NHS hospitals on targets may reflect the fact that there are a huge number of detailed and often mutually inconsistent targets that are handed down to NHS hospitals from Central government (Smith 2002; Jacobs et al 2006). The low scores on people management may reflect the high degree of central regulation and union power over hiring, pay and promotions.

In columns (7) - (9) we widen the sample still further using data on manufacturing firms from other European countries[25]. We do this in order to show a contrast between government and non-government owned ("private") firms in the manufacturing sector as a whole (this cannot be done just for the UK as there are no government owned manufacturing firms in our sample). Column (7) simply includes a dummy for hospitals as in column (1) and shows a large negative coefficient as before. Column (8) also includes a private sector dummy and illustrates that privately owned firms score more highly on the management score than state owned firms (see also Bloom et al, 2007).

[25] See Bloom, Sadun and Van Reenen (2008) for a discussion of this larger survey.

The final column repeats our earlier specification on the UK which includes a dummy for private hospitals but also includes the private sector dummy from the previous column. The public-private difference in healthcare partly reflects a general public-private difference in management scores elsewhere in the economy. But the difference in healthcare is even stronger than that elsewhere (as a test of the difference between the management score of a private hospital and a private manufacturing firm has a p-value of 0.06).

In summary, publicly owned hospitals have a lower management score both compared to the manufacturing sector and with private sector hospitals. These are purely descriptive results and should not be read to say that the low scores of NHS hospitals are necessarily because they are publicly owned. Nevertheless, the pattern of results does suggest that the lack of autonomy of local managers in the centralized healthcare system of the UK may be behind the low management scores. We now turn to a deeper investigation of this.

V EXPLAINING HEALTHCARE MANAGEMENT SCORES IN THE PUBLICLY OWNED HOSPITAL SECTOR

To investigate the factors that influence hospital management score we regress the management score (for the 16 question used previously) against several potentially relevant factors. These include a dummy variable for whether the hospital is a Foundation trust (a public sector hospital with greater autonomy from the Government), the proportion of managers with a clinical degree and measures of joint decision-making. We also include the general controls and noise controls as in previous tables.

The results are presented in Table 5 with column (8) our preferred specification which includes all covariates and noise controls. In column (1) we see that Foundation trusts score more highly on management. This is an interesting result and accords with intuition that greater freedom from the Government is associated with improved management practices[26]. Teaching hospitals are also generally better managed as can be seen in column (2).

[26] This result would also arise if Foundation trust status was only possible for hospitals that had better management. Although our scores were not used for this purpose we know that they are correlated with HCC rating, which was a factor in determining whether trusts achieved Foundation Trust status.

Column (3) shows that the proportion of managers with a clinical degree is positive and significant. This indicates that a separation of clinical and managerial knowledge inside the hospital is associated with worse management. This might due to the fact that it is easier for a manager to monitor what clinicians are doing if he has clinical knowledge himself. Or it might indicate that it is important for managers and physicians to "speak the same language" in order to be able to communicate efficiently with each other[27]. Interestingly having a degree in management has less of an influence on the management score as can be seen in columns (4) and (5). This shows it is not generally high-skilled managers that improve management practices. It is rather the specific skill-set that managers with clinical knowledge bring along that is associated with better management practices in hospitals.

In columns (6) and (7) the management score is regressed on measures of joint decision making. In column (6) we use a measure for whether the hospital's business plan was developed mainly by clinicians, mainly by managers or by both groups together. The variable used in the regression is a dummy equal to one if the decision was taken jointly. If decisions are taken by clinician and managers together this has a significantly positive impact on the management score. For column (7) a measure of decision-making regarding the allocation of work is used.[28] Again this has a positive association with the management score.

Taking decisions jointly seems to be important both for the broader strategy embodied in the business plan and daily routines like the allocation of work. The result is consistent with the hypothesis that communication between managers and clinicians is beneficial for the management of the hospital. This finding, and the positive link between management and the proportion of managers with a clinical degree, accords with the movement towards integration of clinicians into decision making at all levels of hospitals in both the USA and Europe (Department of Health, 2008).

[27] Interestingly, it is much rarer in the UK than the US for senior physicians to going into a senior managerial position such as Chief Executive of a large general hospital (the salaries and status of these positions is relatively less attractive in the UK).

[28] For this questions interviewees could answer 1 – clinicians only, 2 – mostly clinicians, 3 – equal, 4 – mostly managers, 5- managers only. For the regression a variable was used that takes the value 0 if only one group took the decisions, 1 if one group mostly made decision and 2 if there was joint decision-making.

VI CONCLUSIONS

In this paper we have described a new methodology for quantifying the quality of management practices in the healthcare sector. We have implemented this survey tool on almost two thirds of acute hospitals in England. We found that our measure of management quality was robustly associated with better hospital outcomes across mortality rates and other indicators of hospital performance. This is consistent with Bloom and Van Reenen's (2007) work in the manufacturing sector.

We then exploit the UK's centralized public hospital network to provide an instrument for hospital competition. We use the share of marginal political constituencies around each hospital as an instrument for the number of nearby competing hospitals. This works well because in the UK politicians rarely allow hospitals in politically marginal constituencies to close down, leading to higher levels of hospital competition in areas with more marginal constituencies. We find in both OLS and 2SLS (using our political instrument) that more hospital competition leads to improved hospital management. This suggests public sector competition is useful for improving the management practices of public sector managers.

We also find that management in public hospitals have significantly lower scores than firms in the manufacturing sector. Public hospitals are also worse managed than private hospitals, although the latter deal with a much smaller fraction of (wealthier) patients with less acute treatments. Among public sector hospitals management scores are significantly higher in Foundation Trusts (hospitals with greater operating autonomy), for larger hospitals, where managers have more clinical expertise and where key decisions are made jointly between clinicians and managers.

In terms of future work, it would be extremely interesting to expand our sample to look at healthcare management in other countries. We have piloted some work along these lines and plan to implement this in the US and other nations. We also intend to look more closely at the role of competition, exploiting changes in UK policy over recent years. Finally, examining how hospitals of different management quality and ownership respond differentially to shocks could be very revealing (Duggan, 2000).

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Table 1: Means and Standard Deviations of Variables

Variable	Mean	Standard Deviation
Mortality from emergency AMI after 28 days (quarterly average)	16.9	11.0
Mortality from all emergency surgery after 30 days (quarterly average)	2.56	1.11
Mortality from selected emergency general surgery after 30 days (admissions into General surgery Unit only, quarterly average)	5.20	1.70
Infection rate of MRSA per 10,000 bed days (half yearly)	1.57	0.89
Numbers on waiting list	5,764	3,226
Percentage on waiting list at risk of breaching national target	0.923	1.025
Likelihood of leaving in next 12 months (1=very unlikely, 5=very likely)	2.667	0.128
Average Health Care Commission rating (1-4 scale)	2.25	0.68
Pseudo HCC rating (standardized)	0.00	1
Proportion of physicians in total hospital employment	11	2
Managers with a clinical degree	50.3	31.7
Crude Mortality Rate in hospital's area (per 100,000 population)	932	138
Foundation Trust (hospitals with greater autonomy)	34.2	47.6
Number of competing hospitals in 30km radius (total)	20	27
Number of competing hospitals in 30km radius (public)	13	17
Respondent is in Cardiology (i.e. not orthopedics)	51.6	50.3
Respondent a physician (i.e. not a manager)	21.1	40.9
Respondent's tenure in the post (years)	3.50	3.79
Respondent's tenure in the trust (years)	10.28	8.56
Interview duration (minutes)	59.27	13.38
Number of patient-cases (per quarter)	15,513	8,207
Total employment	3,651.04	2,016.85
Number of sites	2.65	2.01
Medical Employees (Full-Time equivalent)	387.73	233.06

Notes: These are means and standard deviations for the sample of publicly owned acute hospital observations (NHS). There are usually 161 observations although exact number varies due to missing values.

Table 2: Hospital Performance and management practices

Dependent Variable:	(1) Mortality rate from emergency AMI	(2) Mortality rate from all emergency surgery	(3) Total waiting list	(4) Proportion in waiting list "at risk" of breaching national target	(5) MRSA infection rate	(6) Average intention of staff to leave in next 12 months	(7) Health Care Commission (HCC) overall rating	(8) "Pseudo" HCC rating
Management Practices Score (average over 16 Questions)	-0.061**	-0.018***	-0.098***	-0.181**	-0.151	-0.281**	0.408***	0.386***
	(0.025)	(0.006)	(0.034)	(0.073)	(0.093)	(0.121)	(0.079)	(0.093)
Observations	140	157	160	160	160	160	161	161
Management Practices Score (average over 18 Questions)	-0.050*	-0.018***	-0.096***	-0.187**	-0.153	-0.261**	0.366***	0.396***
	(0.025)	(0.006)	(0.035)	(0.074)	(0.099)	(0.110)	(0.076)	(0.090)
Observations	140	157	160	160	160	160	161	161

Notes: All dependent variables are standardized to be mean zero and standard deviation 1. The dependent variables in columns (1) through (7) are generally considered to be "bad" whereas those in (8) and (9) are "good" – see text for more details. Management scores are also standardized across the questions in Appendix A. These are OLS regressions with standard errors that are clustered at a hospital level (the unit of observation is a management interview with a service line in cardiology or orthopaedics across 100 public acute hospitals). *** significant at 1% level; ** significance at 5%, * for significance at 10%. All columns include "general controls" whether the respondent was a manager or clinician, speciality dummy, 10 regional dummies and the number of total admissions at the hospital level. Controls for case mix are also included, but vary across columns (see text for discussion). All columns also include "noise controls" comprising interviewer dummies, duration of the interview, number of questions not answered and tenure of the interviewee. The observations are weighted by the inverse of the number of interviews with the same hospital. Column (8) is average of HCC's rating on resource use and quality of service. Column (9) is our self-constructed HCC rating based on several indicators. Column (3) is mortality from general surgery following emergency admissions

Table 3: Management Practices and Competition

	(1)	(2)	(3)	(4)	(5)
Type of Regression	OLS	IV: First Stage	IV: Second Stage	IV: Second Stage	IV: Second Stage
Dependent variable	Management	# Competing Hospitals	Management	Management	Management
Controls for Labour vote share	Linear	Linear	Linear	Cubic	None
Number of Competing Public Hospitals	0.129**		0.353*	0.384**	0.350*
	(0.052)		(0.201)	(0.181)	(0.199)
Number of Competing Public Hospital Sites					
Proportion of Labour Marginal Constituencies		4.344***			
		(1.320)			
Labour Share of Votes	-0.001	-0.040	0.009	-0.002	
	(0.017)	(0.033)	(0.019)	(0.138)	
Labour Share of Votes, squared				-0.000	
				(0.004)	
Labour Share of Votes, cubed				0.000	
				(0.000)	
F-statistic of instrument		10.83***			
Observations	161	161	161	161	161
Noise controls	Yes	Yes	Yes	Yes	Yes

Notes: Competition is measured as the number of hospitals in a 30km radius around the hospital. A Political Constituency is defined as marginal if it was won by less than 5% in the 1997 UK General Election. The Labour share of votes is the absolute share obtained by the Labour party in the 1997 UK General Election. Both are averaged over all constituencies in a 30km radius. OLS regressions with robust standard errors that are clustered at a hospital level (the unit of observations is a service line in cardiology or orthopaedics, so we have up to four observations in each hospital). All columns include "general controls" whether the respondent was a manager or clinician, speciality dummy, 10 regional dummies and the number of total admissions as well as the "case-mix" (age-/gender-profile of admissions) at the hospital level. All columns also include "noise controls" comprising interviewer dummies, duration of the interview, number of questions not answered and tenure of the interviewee. Additional controls are a foundation trust and a teaching hospital dummy, the percentage of managers with a clinical degree and two variables which measure joint decision-making. Finally we include area demographics: the total population in a 30km radius as well as the age-/gender profile is used. The observations are weighted by the inverse of the number of interviews with the same hospital.

Table 4: Management Practice Regressions: Comparing across sectors

Sample	(1) Hospitals	(2) Hospital and Manufact.	(3) Hospital and Manufact.	(4) Hospital and Manufact.	(5) Hospital and Manufact.	(6) Hospital and Manufact.	(7) Hospital and EU Manufact.	(8) Hospital and EU Manufact..	(9) Hospital and EU Manufact.
Management practices	All	All	All	Monitoring	Targets	People	All	All	All
Manufacturing	n/a	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
Hospital		-0.505***	-0.788***	-0.418**	-0.903***	-0.754***	-0.544***	0.131	-0.547**
		(0.170)	(0.160)	(0.162)	(0.179)	(0.154)	(0.170)	(0.211)	(0.227)
Private								0.806***	0.281*
								(0.156)	(0.164)
Private*Hospital	1.442***		1.647***	0.857***	1.293***	1.872***			1.468***
	(0.259)		(0.197)	(0.172)	(0.183)	(0.227)			(0.262)
Number of beds	0.210								
	(0.194)								
Observations	178	828	828	828	828	828	1988	1988	1988
NHS hospitals	161	161	161	161	161	161	161	161	161
Private hospitals	17	20	20	20	20	20	20	20	20
Manufacturing firms	0	647	647	647	647	647	1,797	1,797	1,797

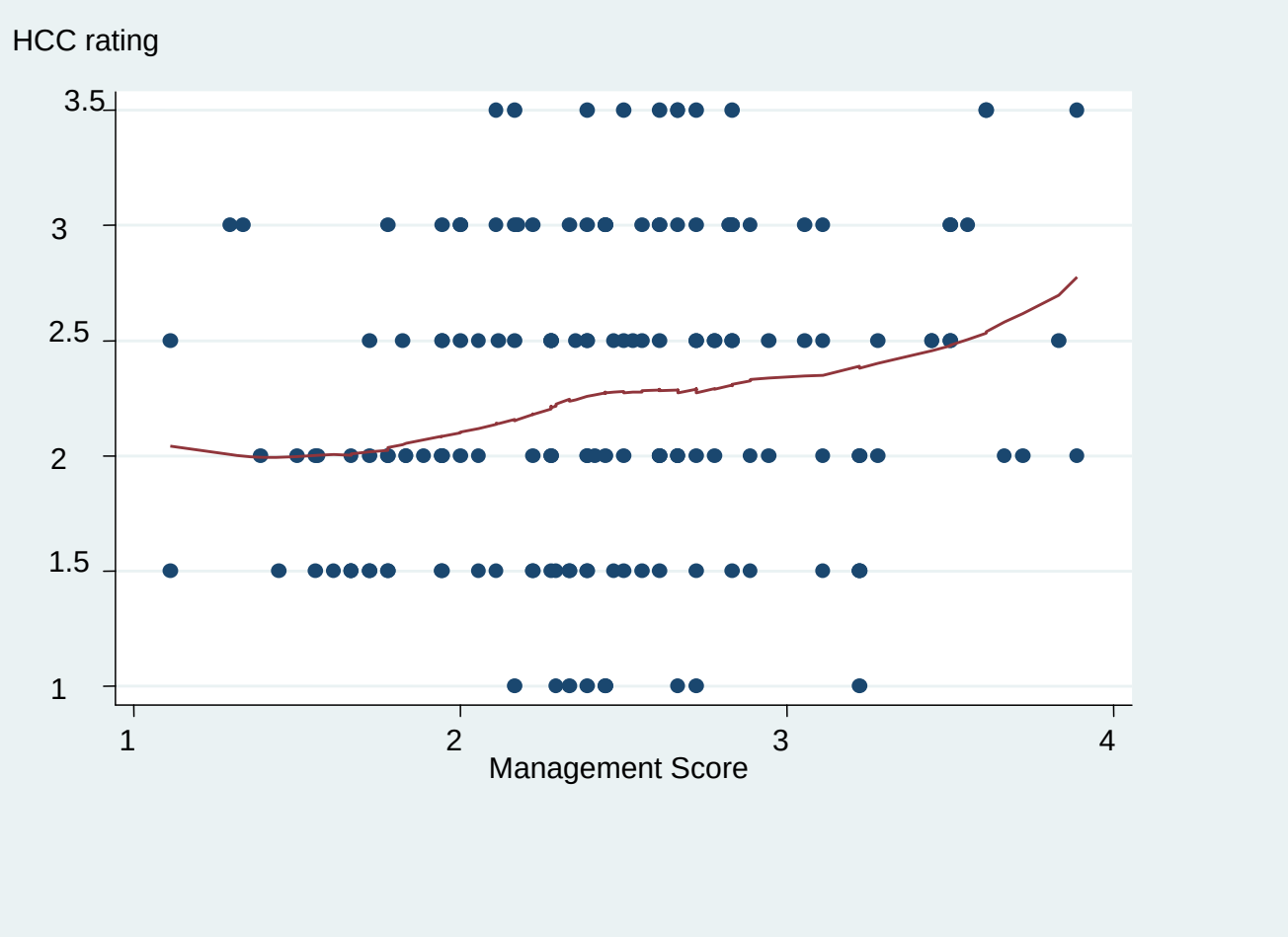
Notes: ***represents significant at the 1% level; **significance at 5%, *significance at 10%. Dependent variable is standardized management score. Management "Type" is whether we average over 16 questions (excluding 2 questions on lean operations) or look at a sub-category (see Appendix A): Monitoring: question 4-6, Targets: question 8-12, People management: question 7 and 13-18. These are coefficients from OLS regressions with robust standard errors that are clustered at the hospital level (the unit of observations is a service line in cardiology or orthopaedics) for the healthcare sector and firm level for manufacturing. Any hospital includes private and public hospitals, private organization includes private hospitals. EU includes manufacturing firms in France, Germany, Italy, Sweden and the UK. All regressions include multinational controls (dummies equal to one if the firm is a domestic or foreign multinational) and Noise controls (interviewer dummies, the duration of the interview and the tenure of the interviewee). The observations are weighted by the inverse of the number of interviews with the same hospital. See text for more discuss

Table 5: Management Practice Regressions, UK public hospitals

Dependent variable	(1) Mgmt	(2) Mgmt	(3) Mgmt	(4) Mgmt	(5) Mgmt	(6) Mgmt	(7) Mgmt	(8) Mgmt
Foundation Hospital	0.826*** (0.202)							0.877*** (0.180)
Teaching Hospital		0.607* (0.330)						0.520** (0.254)
Proportion of Managers …								
…with a clinical degree			0.707* (0.374)		0.694* (0.365)			0.662** (0.328)
… with a degree in management				0.450 (0.407)	0.433 (0.382)			
Joint-decisions: Business plan						0.341* (0.192)		0.231 (0.151)
Joint-decisions: Work allocation							0.184* (0.104)	0.168** (0.081)
Observations	161	161	161	161	161	161	161	161
Noise controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

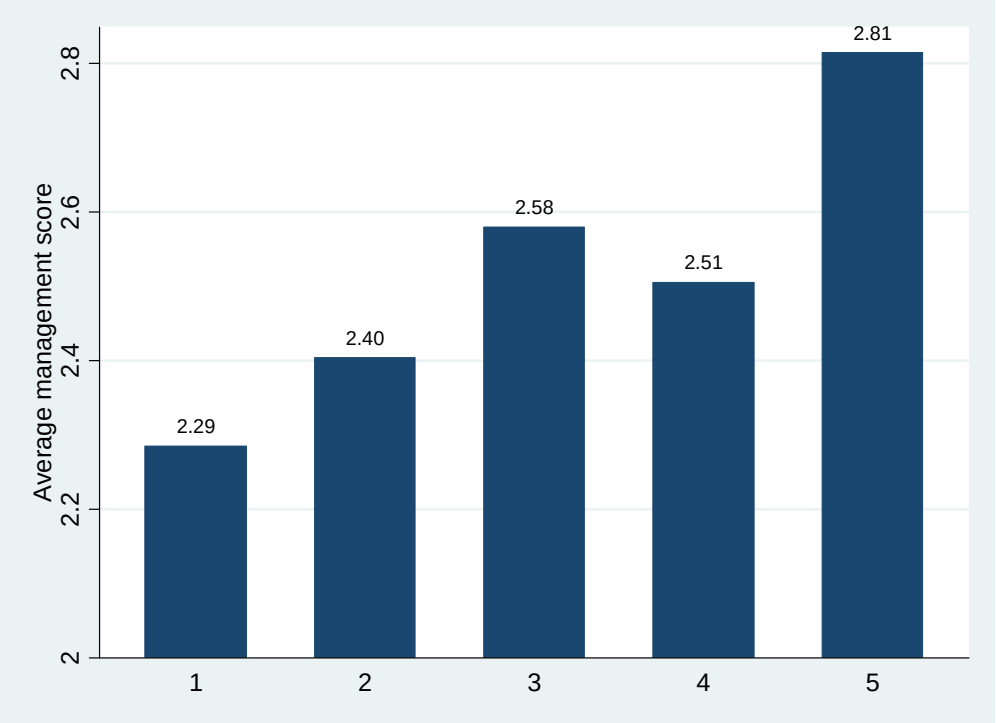
Notes: These are OLS regressions with robust standard errors that are clustered at a hospital level (the unit of observation is a management interview with a service line in cardiology or orthopaedics. *** significant at 1% level; ** significance at 5%, * for significance at 10%. Management is standardized over 16 questions. All columns include "general controls" whether the respondent was a manager or clinician, speciality dummy, 10 regional dummies and the number of total admissions as well as the "case-mix" (age-/gender-profile of admissions) at the hospital level. All columns also include "noise controls" comprising interviewer dummies, duration of the interview, number of questions not answered and tenure of the interviewee. The observations are weighted by the inverse of the number of interviews with the same hospital. See text for more details.

Figure 1: Average HCC score and management score



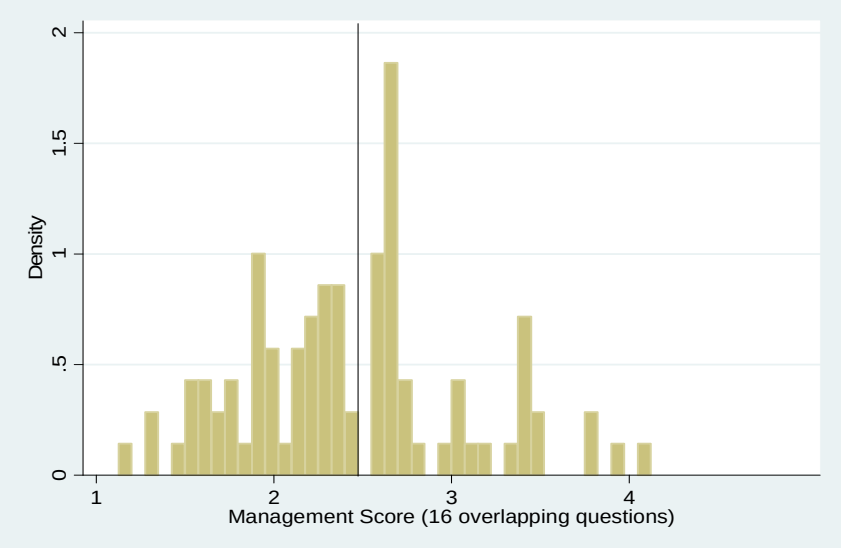
Notes: Each point represents a survey response. Vertical axis shows the average HCC score on "resource use" and "quality of service" in 2005/2006 (original data range is 1 to 4). Horizontal axis is the average management score over the 18 questions. The line is the local linear regression line.

Figure 2: Management Score by quintiles of average HCC rating

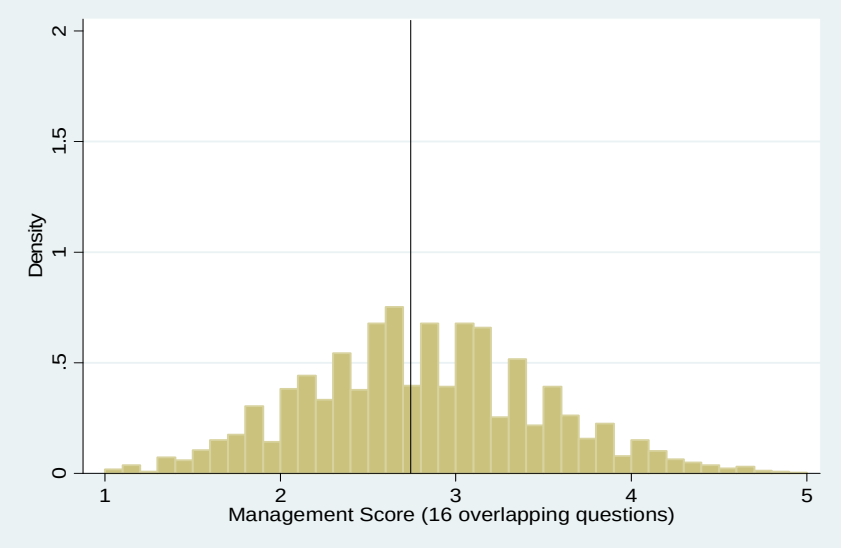


Notes: We divide the HCC average score into quintiles from lowest score (first) to highest score (fifth). We show the average management score (over all 18 questions) in each of the quintiles. The better performing hospitals have higher management scores.

Figure 3: Comparison of Management Scores in Hospitals and Manufacturing Firms



Panel A
Management Scores
in Hospitals



Panel B:
Management Scores
In manufacturing firms

Notes: These are the distributions of the management score for hospitals and manufacturing firms. Only establishments who have between 50 and 5000 employees and who are domestically owned (i.e. multinationals were dropped from the manufacturing sample) were used here. Also observations with a low reliability score (below 3) were dropped. The vertical line represents the average management score in each sample. Only the 16 questions for which manufacturing and healthcare are comparable were used.

APPENDIX A: MANAGEMENT PRACTICE INTERVIEW GUIDE FOR THE HEALTHCARE SECTOR

Any score from 1 to 5 can be given, but the scoring guide and examples are only provided for scores of 1, 3 and 5. Multiple questions are used for each dimension to improve scoring accuracy.

(1) Lay out of patient flow

Tests how well the patient pathway is configured at the infrastructure level and whether staff pro-actively improve their own work-place organisation

a) Can you briefly describe the patient journey or flow for a typical episode?
b) How closely located are wards, theatres, diagnostics centres and consumables?
c) Has the patient flow and the layout of the hospital changed in recent years? How frequently do these changes occur and what are they driven by?

	Score 1	Score 3	Score 5
Scoring grid:	Lay out of hospital and organisation of workplace is not conducive to patient flow, e.g., ward is on different level from theatre, or consumables are often not available in the right place at the right time	Lay out of hospital has been thought-through and optimised as far as possible; work place organisation is not regularly challenged/changed (or vice versa)	Hospital layout has been configured to optimize patient flow; workplace organization is challenged regularly and changed whenever needed

(2) Rationale for introducing standardisation/ pathway management

Test the motivation and impetus behind changes to operations and what change story was communicated

a) Can you take me through the rationale for making operational improvements to the management of patient pathway? Can you describe a recent example?
b) What factors led to the adoption of these practices?
c) Who typically drives these changes?

	Score 1	Score 3	Score 5
Scoring grid:	Changes were imposed top down or because other departments were making (similar) changes, rationale was not communicated or understood	Changes were made because of financial pressure and the need to save money or as a (short-term) measure to achieve government targets	Changes were made to improve overall performance, both clinical and financial, with buy-in from all affected staff groups. The changes were communicated in a coherent 'change story'

(3) Continuous improvement

Tests process for and attitudes to continuous improvement and whether things learned are captured/documented

a) How do problems typically get exposed and fixed?
b) Talk me through the process for a recent problem that you faced
c) How do the different staff groups get involved in this process? Can you give examples?

	Score 1	Score 3	Score 5
Scoring grid:	No, process improvements are made when problems occur, or only involve one staff group	Improvements are made irregular meetings involving all staff groups, to improve performance in their area of work (e.g., ward or theatre)	Exposing problems in a structured way is integral to individuals' responsibilities and resolution involves all staff groups, along the entire patient pathway as a part of regular business processes rather than by extraordinary effort/teams

(4) Performance tracking

Tests whether performance is tracked using meaningful metrics and with appropriate regularity

a) What kind of performance indicators would you use for performance tracking?
b) How frequently are these measured? Who gets to see these data?
c) If I were to walk through your hospital wards and theatres, could I tell how you were doing against your performance goals?

	Score 1	Score 3	Score 5
Scoring grid:	Measures tracked do not indicate directly if overall objectives are being met, e.g., only government targets tracked. Tracking is an ad-hoc process (certain processes aren't tracked at all).	Most important performance indicators are tracked formally; tracking is overseen by senior staff.	Performance is continuously tracked and communicated against most critical measures, both formally and informally, to all staff using a range of visual management tools

(5) Performance review

Tests whether performance is reviewed with appropriate frequency and communicated with staff

a) How do you review your KPI's?
b) Tell me about a recent meeting
c) Who is involved in these meetings? Who gets to see the results of this review?
d) What is the follow-up plan?

	Score 1	Score 3	Score 5
Scoring grid:	Performance is reviewed infrequently or in an un-meaningful way e.g. only success or failure is noted	Performance is reviewed periodically with both successes and failures identified. Results are communicated to senior staff. No clear follow up plan is adopted.	Performance is continually reviewed, based on the indicators tracked. All aspects are followed up to ensure continuous improvement. Results are communicated to all staff.

(6) Performance dialogue

Tests the **quality** of review conversations

a) How are these meetings structured?
b) During these meetings do you find that you generally have enough data?
c) What type of feedback occurs in these meetings?

	Score 1	Score 3	Score 5
Scoring grid:	The right information for a constructive discussion is often not present or the quality is too low; conversations focus overly on data that is not meaningful. Clear agenda is not known and purpose is not explicitly. Next steps are not clearly defined	Review conversations are held with the appropriate data present. Objectives of meetings are clear to all participating and a clear agenda is present. Conversations do not, drive to the root causes of the problems, next steps are not well defined	Regular review/performance conversations focus on problem solving and addressing root causes. Purpose, agenda and follow-up steps are clear to all. Meetings are an opportunity for constructive feedback and coaching

(7) Consequence management

Tests whether differing levels of (personal) performance lead to different consequences (good or bad)

a) Let's say you've agreed to a follow up plan at one of your meetings, what would happen if the plan weren't enacted?
b) How long is it between when a problem is identified to when it is solved? Can you give me a recent example?
c) How do you deal with repeated failures in a specific sub-specialty or cost area?

	Score 1	Score 3	Score 5
Scoring grid:	Failure to achieve agreed objectives does not carry any consequences	Failure to achieve agreed results is tolerated for a period before action is taken	A failure to achieve agreed targets drives retraining in identified areas of weakness or moving individuals to where their skills are appropriate

(8) Target balance

Test whether targets cover a sufficiently broad set of metrics

a) What types of targets are set for the hospital? What are the goals for your specialty?
b) Tell me about goals that are not set externally (e.g. by the government, regulators).

Score 1	Score 3	Score 5

Scoring grid:	Goals focussed only on government targets and achieving the budget	Goals are balanced set of targets (including quality, waiting times, operational efficiency, and financial balance). Goals form part of the appraisal for senior staff only or do not extend to all staff groups. Real interdependency is not well understood	Goals are a balanced set of targets covering all four dimensions (see left). Interplay of all four dimensions is understood by senior and junior staff (clinicians as well as nurses and managers)

(9) Target inter-connection

Tests whether targets are tied to hospital/Trust objectives and how well they cascade down the organisation

a) What is the motivation behind your goals?
b) How are these goals cascaded down to the different staff groups or to individual staff members?
c) How are your targets linked to hospital performance and its goals?

	Score 1	**Score 3**	**Score 5**
Scoring grid:	Goals do not cascade down the organisation	Goals do cascade, but only to some staff groups, e.g., nurses only	Goals increase in specificity as they cascade, ultimately defining individual expectations, for all staff groups

(10) Time horizon of targets

Tests whether hospital/Trust has a '3 horizons' approach to planning and targets

a) What kind of time scale are you looking at with your targets?
b) Which goals receive the most emphasis?
c) Are the long term and short term goals set independently?
d) Could you meet all your short-run goals but miss your long-run goals?

	Score 1	**Score 3**	**Score 5**
Scoring grid:	Top staff's main focus is on short term targets	There are short and long term goals for all levels of the organisation. As they are set independently, they are not necessarily linked to each other	Long term goals are translated into specific short term targets so that short term targets become a 'staircase' to reach long term goals

(11) Target stretch

Tests whether targets are appropriately difficult to achieve

a) How tough are your targets? Do you feel pushed by them?
b) On average, how often would you say that you meet your targets?
c) Do you feel that on targets all specialties, departments or staff groups receive the same degree of difficulty? Do some groups get easy targets?
d) How are the targets set? Who is involved?

	Score 1	Score 3	Score 5
Scoring grid:	Goals are either too easy or impossible to achieve, at least in part because they are set with little clinician involvement, e.g., simply off historical performance	In most areas, senior staff push for aggressive goals based, e.g., on external benchmarks, but with little buy-in from clinical staff. There are a few sacred cows that are not held to the same standard	Goals are genuinely demanding for all parts of the organisation and developed in consultation with senior staff, e.g., to adjust external benchmarks appropriately

(12) Clarity and comparability of targets

Tests how easily understandable performance measures are and whether performance is openly communicated

a) If I asked your staff directly about individual targets, what would they tell me?
b) Does anyone complain that the targets are too complex?
c) How do people know about their own performance compared to other people's performance?

	Score 1	Score 3	Score 5
Scoring grid:	Performance measures are complex and not clearly understood, or only relate to government targets. Individual performance is not made public	Performance measures are well defined and communicated; performance is public at all levels but comparisons are discouraged	Performance measures are well defined, strongly communicated and reinforced at all reviews; performance and rankings are made public to induce competition

(13) Managing talent

Tests what emphasis is put on talent management

a) How do senior staff show that attracting and developing talent is a top priority?
b) Do senior managers, clinicians or nurses get any rewards for bringing in and keeping talented people in the hospital?

	Score 1	Score 3	Score 5
Scoring grid:	Senior staff do not communicate that attracting, retaining and developing talent throughout the organisation is a top priority	Senior management believe and communicate that having top talent throughout the organisation is key to good performance	Senior staff are evaluated and held accountable on the strength of the talent pool they actively build

(14) Rewarding high performers

Tests whether good performance is rewarded proportionately

a) How does your appraisal system work? Tell me about your most recent round.
b) Are there any non-financial or financial (bonuses) rewards for the best performers across all staff groups?
c) How does the bonus system work?
d) How does your reward system compare to that at other comparable hospitals?

	Score 1	Score 3	Score 5
Scoring grid:	People are rewarded equally irrespective of performance level	There is an evaluation system for the awarding of performance related rewards that are non-financial (beyond progression through nursing grades or clinical excellence awards for doctors) at the individual level (but rewards are always or never achieved)	There is an evaluation system for the awarding of performance related rewards, including personal financial rewards

(15) Removing poor performers

Tests whether hospital is able to deal with underperformers

a) If you had a clinician or a nurse who could not do his job, what would you do? Could you give me a recent example?
b) How long would underperformance be tolerated?
c) Do you find staff members who lead a sort of charmed life? Do some individuals always just manage to avoid being fixed/fired?

	Score 1	Score 3	Score 5
Scoring grid:	Poor performers are rarely removed from their positions	Suspected poor performers stay in a position for a few years before action is taken	We move poor performers out of the hospital/department or to less critical roles as soon as a weakness is identified

(16) Promoting high performers

Tests whether promotion is performance based

a) Tell me about your promotion system?
b) What about poor performers? What happens with them? Are there any examples you can think of?
c) How would you identify and develop your star performers?
d) Are better performers likely to promote fasters or are promotions given on the basis of tenure/seniority?

	Score 1	Score 3	Score 5
Scoring grid:	People are promoted primarily on the basis of tenure	People are promoted upon the basis of performance (across more than one dimension, e.g., isn't related only to research or clinical excellence)	We actively identify, develop and promote our top performers

(17) Attracting talent

Tests how strong the employee value proposition is

a) What makes it distinctive to work at your hospital, as opposed to your other similar hospitals?
b) If I were a top nurse or clinician and you wanted to persuade me to work at your hospital, how would you do this?
c) What don't people like about working at your hospital?

	Score 1	Score 3	Score 5
Scoring grid:	Our competitors offer stronger reasons for talented people to join their hospitals	Our value proposition to those joining our department is comparable to those offered by others hospitals	We provide a unique value proposition to encourage talented people join our department above our competitors

(18) Retaining talent

Tests whether hospital/Trust will go out of its way to keep its top talent

a) If you had a top performing manager, nurse or clinician that wanted to leave, what would the hospital do?
b) Could you give me an example of a star performer being persuaded to stay after wanting to leave?
c) Could you give me an example of a star performer who left the hospital without anyone trying to keep them?

	Score 1	Score 3	Score 5
Scoring grid:	We do little to try and keep our top talent	We usually work hard to keep our top talent	We do whatever it takes to retain our top talent across all three staff groups

APPENDIX B: Data

Sample

The main sampling frame was all acute public sector hospitals (NHS "trusts"[29]) in England. There were 174 such units in 2006, but we dropped hospitals without orthopaedics or cardiology departments (e.g. specialist eye hospitals) so this left us with a sample of 164 possible hospital trusts. We obtained 161 usable responses from 100 hospital trusts which represented 61% of the frame, so we essentially have the population. We sought responses from up to four senior employees in each hospital: a manager and a clinician from two service lines (cardiology and orthopaedics). Table 1 shows that we are split evenly between the specialities (52% cardiology and 48% orthopaedics), but also that it was harder to obtain interviews with the physicians than managers (80% of the respondents were managers). Table B3 shows the breakdown of the number of interviews by hospital: we only obtained one interview for 53 of the trusts.

We examined evidence for selection bias by estimating probit models of whether a trust responded on the observable characteristics. These characteristics are draw from Department of Health datasets (such as Hospital Episode Statistics). Table B4 contains the results of this exercise. There is no significant correlation between sample response and any of the performance measures or the covariates which suggests that there was little systematic response bias.

It is more difficult to carry out a similar exercise for the private hospitals as there is less information on the non-responding hospitals (public hospitals are required to lodge a large amount of data with the Department of Health whereas private hospitals are not). We were, however, able to obtain some data from Laing and Buisson 215 private sector hospitals where some form of orthopaedic or cardiological services were available. This would make our sample only about 10% of the total. The dataset only has basic information. We examined whether there was any correlation with the number of beds (a proxy for size). This variable was insignificant as was the number of day places.

In the regressions all interviews with a very short duration (less than 25 minutes) or many unanswered questions (at least 3) are excluded completely as the information obtained is not reliable.

We weight regressions by the inverse of the number of interviews so that hospitals with multiple responses are weighted less (we also cluster standard errors at the hospital level.

Construction the Pseudo HCC Rating

In column (9) of Table 2 we reported our best effort to reconstruct the HCC's rating. Although the exact method of creating the HCC ratings is not publicly known the

[29] A trust can consist of more than one site (as a firm can consist of more than one plant). The median number of sites was 2 with a range from 1 to 10.

Appendix of the HCC's "Annual Health Check 2006/2007" brochure mentions seven "domains" in which the hospitals need to achieve certain standards in order to achieve a high score.

These domains are: safety, clinical and cost effectiveness, governance, patient focus, accessible and responsive care, public health, and care environment and amenities. From the datasets described above we choose eight variables which capture the requirements of these different domains[30]. Infection rates and re-admission risk are chosen to represent the "safety" aspect; operational margin and income per medical FTE capture the financial side; patient satisfaction covers the "patient focus" domain. Waiting times and average length of stay fall into the category "accessible and responsive care" and information on job satisfaction from the NHS staff survey is used to represent the "care environment and amenities" domain.

[30] The only categories which are not covered are governance and public health. Governance is directly related to the management score and therefore should not be included as it is already part of the dependent variable. There is furthermore no information in the data that corresponds to the public health category.

Table B1: Data Sources for hospital performance data

Variable	Notes	Source
Mortality within 28 days of emergency admission for AMI (in hospital and out of hospital)	• During financial quarter • Defined according to NHS mortality rate Performance indicators (PIs) for 2001/02	ONS death records linked with Hospital Episode Statistics (HES), The NHS Information Centre for health and social care.
Mortality within 30 days of surgery for selected emergency procedures. - All specialties - General surgery only	• During financial quarter • Defined according to NHS mortality rate PIs for 2001/02	ONS death records linked with Hospital Episode Statistics (HES), The NHS Information Centre for health and social care.
MRSA rates	• During financial quarter • 2001/02 (q1) to 2004/05 (q3)	Health Protection Agency: Quarterly reporting results for clostridium difficile infections and MRSA bacteraemia
Waiting list size	• At start of quarter (as proxied by end of previous quarter)	Department of Health: Provider based waiting times/list statistics [a]
"Distance from target": % of specialty list at risk of breaching target if untreated by next census date	• At start of quarter (as proxied by end of previous quarter)	Department of Health: Provider based waiting times/list statistics [b]
Probability of leaving in next 12 months	Respondents are asked to rate chances of	NHS Staff Survey[c] (2006). 128,328 NHS staff responded and results are reported as average of scale by each trust

	leaving on a 1 to 5 scale.	
Healthcare Commission rating[c]	All trusts are scored on a scale of 1 to 4 on "resource use" and quality of "care"	Our main indicator averages over the two measures and standardizes. We also construct our own "pseudo" HCC rating from the underlying indicators (see Appendix B for full description)
Local authority all cause mortality rates	• Calendar year	Office of National Statistics 1995-2004
Casemix of admissions. These are specific to the conditions (AMI, surgery, etc.) considered. For the general performance indicators (like HCC rating) we use all patients admitted.	• Proportion of admitted patients in each sex-specific age band. 11 categories: 0-15, 16-45, 46-50, 51-55, 56-60, 61-65, 66-70, 71-75, 76-80, 81-85, >85. So so up to 22 controls.	Hospital Episode Statistics (HES), The NHS Information Centre for health and social care.

Notes: Mortality indicators, the MRSA indictor, waiting times and waiting lists have been used by the UK healthcare regulator to assess the performance of hospitals in the NHS.

[a] http://www.performance.doh.gov.uk/nhsperformanceindicators/2002/trdca_t.doc.

[b] http://www.performance.doh.gov.uk/waitingtimes/index.htm

[c] http://www.healthcarecommission.org.uk/guidanceforhealthcarestaff/nhsstaff/nhsstaffandpatientsurveys/staffsurveys.cfm

Table B2: Hospitals compared with manufacturing

	Variable	Mean	Std. Dev.	Mean UK manufacturing	Difference to manufacturing	Difference significant (1% level)
Overall	Average Management Score	2.57	0.66	2.96	-0.39	*
Subcategories	Average Operations Score	2.83	0.95	not applicable		
	Average Monitoring Score	3.00	0.75	3.32	-0.32	*
	Average Targets Score	2.47	0.78	2.93	-0.45	*
	Average People Man. Score	2.35	0.70	2.86	-0.51	*
Operations	Layout of patient flow	2.76	1.18	not applicable		
	Rational for standardisation	2.88	1.24	not applicable		
	Continuous improvement	2.90	1.12	3.13	-0.24	*
Monitoring	Performance tracking	2.97	0.94	3.38	-0.42	*
	Performance review	3.26	0.91	3.36	-0.10	
	Performance dialogue	2.77	0.95	3.21	-0.44	*
Targets	Target balance	2.33	1.26	2.94	-0.60	*
	Target inter-connection	3.01	1.15	3.01	0.00	
	Time horizon of targets	2.20	1.29	3.08	-0.89	*
	Target stretch	2.61	1.02	3.01	-0.39	*
	Clarity and comparability of targets	2.21	0.88	2.60	-0.39	*
People management	Consequence management	3.03	1.09	3.19	-0.15	
	Managing talent	1.71	1.01	2.43	-0.72	*
	Rewarding high performers	2.01	0.97	2.62	-0.61	*
	Removing poor performers	2.56	1.08	3.13	-0.57	*
	Promoting high performers	2.49	0.98	3.04	-0.55	*
	Attracting talent	2.85	0.99	3.08	-0.23	*
	Retaining talent	1.83	1.05	2.51	-0.69	*

Notes: These are tests are the difference between publicly owned NHS hospitals with manufacturing firms in the UK.

Table B3: Hospitals Interviewed

Number of Interviews per NHS hospital:

interviews	hospitals	Observations
1	53	53
2	34	68
3	12	36
4	1	4
Total	100	161

Notes: The unit of observation is an interview with either a manager or a clinician based at cardiology or orthopedics. Up to four interviews per hospital are possible. There were 161 interviews in 100 hospital trusts.

Table B4: Sample Selection for public hospitals?

Variable	Marginal effect (standard error)	Observations
Mortality rate from AMI	0.129(0.161)	133
Mortality rates from general surgery	0.239(0.334)	163
Mortality rates from selected high risk surgery	0.017(0.049)	152
Total Waiting List	0.025(0.045)	163
Proportion on waiting list "at risk"	0.026(0.060)	163
MRSA Infection rate	-0.025(0.041)	163
Health Care Commission overall rating	-0.014(0.056)	163
HCC Rating over sub-set of indicators	0.067(0.090)	164
Area Standardized Mortality Rate	0.0003(0.0003)	162
Number of patient cases/10000	0.018(0.470)	163
Number of employees/10000	-0.039(0.200)	164
Proportion doctors	-2.463(2.177)	154
Foundation Trust	0.091(0.082)	164

Notes: These are the results from separate probit ML regression of whether a public hospital had any response to the survey on the relevant variable (e.g. mortality rates in the first row). There is a population of 164 potential acute hospitals in England and we had 100 hospitals with at least one respondent.