# Comparative performance of UK PFI and non-PFI hospitals

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Since the first PFI hospital was established in 1994, many debates centred on the value for money and risk transfer in PFIs. Little concern is shown with PFI hospitals' performance in delivering healthcare. Exploratory research was carried out to compare PFI with non-PFI hospital performance. Five performance indicators were analysed to compare differences between PFI and non-PFI hospitals, namely the length of waiting, the length of stay, MRSA infection rate, C difficile infection rate and patient experience. Data was collected from various government bodies. The results show that only some indexes measuring patient experience emerge statistically significant. This leads to a conclusion that PFI hospitals may not perform better than non-PFI hospitals but they are not worse than non-PFI hospitals in the delivery of services. However, future research needs to pay attention to reliability and validity of data sets currently available to undertake comparison.

**Keywords: PFI, procurement, hospital, healthcare service, healthcare performance**

## INTRODUCTION

Since the first new built hospital project was approved under the Private Financial Initiative (PFI) scheme in 1997, 92 PFI hospital projects have been undertaken. Although PFI hospitals have become increasingly popular, they also raised many criticisms. PFI schemes were originally created with the aim to achieve three purposes: good value for money, risk transfer from public sector to private sector, and bringing in private sector management skills and innovation abilities. However, whether these purposes have been achieved is still debated.

Only now, a decade after its inception, longer-term problems are surfacing.

Pollock et al. (2002) and Broadbent et al. (2003) examined whether 'value for money' is achieved in PFI hospitals. The results show that this is debatable and requires further monitoring of the impact of change over time. Some evidence indicates that the number of beds and the size of the space in PFI hospitals are reduced (Pollock et al., 2001). Also, new built wards are more compact as the ratio of numbers of beds per ward has increased. The reduction in actual bed numbers and space are considered having significant impact on a hospital's capacity of admitting inpatients, infection control and patients' experience within the hospital environment.

Gaffney et al. (1999) argued that PFI is an expensive method of procuring a new hospital as it causes affordability problems at local and national level and inevitably cutting down services is a way of financing this. Shaoul (2005) argues that ambiguous concepts of risk

transfer and value for money implemented for many of the projects without considering the whole system may have caused more problems for individual PFI projects.

Furthermore, some scholars (e.g. Pollock et al., 2002) are concerned that risks are not actually transferred from the public sectors to the private sectors. Although the private sector finances, builds, operates and maintains the building, the faults or delays in the design, construction and maintenance will impact on the delivery of healthcare services. The risks at the end would fall on the Trusts and the consortiums together. This is partially due to the nature of the risk as it is difficult to be identified and assigned as part of contractual arrangements. Therefore, the risks would not be completely transferred from the public sectors to the private sectors as initially suggested.

As most of the attention has been given to the above issues in the first wave of reviews of PFI hospitals, only little concern with whether PFI hospitals provide more efficient and effective healthcare services and safety has been voiced. Therefore, this paper looks at whether the PFI and non PFI hospitals show different performance in the delivery of healthcare services. The data presented in this paper is based on some exploratory research. The aim of the research was to begin identifying indicators against which the performance of PFI against non PFI hospitals can be compared. Whilst there is some literature on the value of PFI initiatives, little research provides evidence of the performance difference of the two procurement routes to services provision. In order to begin to identify measures, the research set out to explore the possibility of using existing and accessible performance indicators for hospitals to identify potential differences in performance of PFI and non PFI hospitals. The following research outlines the process and the questions that have been raised in beginning to uncover potential measurements of success.

## PERFORMANCE OF HEALTHCARE SERVICE DELIVERY IN HOSPITALS

In order to achieve the aim of this paper, it is necessary to look at what performance is and how it is measured.

The performance of delivery of healthcare services at the hospital level is associated with many factors e.g. clinical practice, administration (Rosenthal, 1998), built environment (Mallak et al., 2003) etc. From a patient perspective an efficient and effective treatment may be of concern. By adopting this perspective, the term ‘performance’ in this paper therefore is defined as efficiently, effectively and safely delivering healthcare services by the hospitals.

In light of this perspective, how performance can be measured and what are the appropriate measures needs to be considered. There is extensive research that has tackled this issue in the last decades. For instance, Romano et al. (1995) use mortality, post-operative complication, post-operative length of stay and readmission to measure hospital outcomes. DesHarnais et al. (1990) employ risk-adjusted indexes of mortality, readmissions and complications to test hospital performances. Iezzoni et al. (1996),

Austin et al. (2001), Werner et al. (2006) and Thomas et al. (1999) work on the development of mortality as a measure to evaluate a hospital's performance. However, this research argues that a single measure may not be suitable for determining a hospital's performance, especially since the delivery of healthcare service is this research's concern. Therefore, a set of multidimensional measures seems to be more appropriate for this research.

The UK government has set up 198 targets (DoH, 2004) as guidelines and monitoring indicators for the healthcare sector. Some targets are given priority in relation to current issues that ought to be quickly improved. For instance, length of waiting list is one of the priority targets. This indicator is considered as an appropriate performance measures for healthcare delivery. It is related to efficiently and effectively delivering healthcare services. However, a long waiting list is a result of multiple variables across a complex system in which hospital capacity and the communication between different tiers of healthcare providers are determinant. To improve a hospital's waiting list therefore involves improving a hospital's management practice as well as clinical practice. To tackle this problem, the length of waiting time is given as an indicator to monitor the mechanism of referral and admission of patients. Furthermore, the length of stay is also useful to monitor the use of beds within the hospitals to ensure that occupancy of beds is sustained at a reasonable level. Both length of waiting and duration of stay can be seen as appropriate measures for evaluating a hospital's efficiency.

Furthermore, a patient does not only expect an efficient treatment but also is concerned with the quality in terms of effectiveness and safety. However, what is effectiveness? One may say that not having to return to hospital again for a given health concern denotes a patient has been successfully treated. In this case readmission could be an indicator to measure effectiveness of treatment.

In addition to being efficiently and effectively treated, a patient could be infected during a hospital stay. A government report states that 9 per cent of patients have hospital acquired infection in the England (NAO, 2000). Most these cases occur after admission. Therefore, infection control is one prioritised target that the government intends to achieve. This suggests a considerable indicator for evaluating a hospital's performance.

## RESEARCH METHODS

### *Study design and setting*

This research compares the performance between PFI and non PFI hospitals. In the current hospital characterisation, hospitals can be divided into acute hospitals, mental hospitals, healthcare centres, treatment centres and specialist providers. Each type of provider carries different functions within the healthcare systems. In order to perform a consistent analysis, this research focuses on the National Health Service (NHS) acute hospitals. The research aims to compare various indicators that represent efficiency, effectiveness and safety of hospital care.

### *Performance indicators*

Performance indicators are selected based on a perspective of how patients can be treated and cared for efficiently, effectively and safely. In terms of efficiency, the length of waiting time and the length of stay are adopted. The length of waiting is currently a priority target that is associated with cutting down the waiting list. The length of waiting is defined as the period from the date admission is decided to the actual date of admission.

The length of stay is defined as the period from the date of admission until the date of discharge. The length of stay is one of the factors that influence the length of waiting. However, one may argue that patients should not be discharged from hospital before full confidence is achieved that the patient has recovered. This research considers that community care and home care can share the responsibility of acute hospital care when a patient is suitable to be transferred. Thus, the length of stay can be reasonably managed to increase bed occupancy and reduce waiting time. This would be in line with current government initiative of shifting care away from acute providers to more community-based intervention (DoH, 2006).

In terms of effectiveness, readmission and complication are the indicators that are often discussed in the literature. However, these two indicators have no publicly available data. Being constraint in regards to access to data, this research leaves them out from further investigation.

In terms of safety, infection within hospitals is always a threat. It is considered a valid indicator to measure a hospital's safety. According to the Health Protection Agency (2006), there are four types of infections that are to be monitored on a regular basis: Meticillin-resistant Staphylococcus Aureus (MRSA) bacteraemia, Clostridium difficile associated diseases, Glycopeptide-Resistant Enterococcal (GRE) and surgical site infection. This research adopts MRSA and Clostridium difficile infection as the indicators.

In addition to the above indicators, this research also is concerned with patients' responses to the hospital services. According to new national targets published in 2006, the patient experience is included in the monitoring list. It contains five indexes: 'waiting and access', 'safe, high quality and coordinated care', 'better information and more choices', 'building relationship' and 'clean, comfortable and friendly place to be' (DoH, 2004). This research adopts this as an indicator to complement previous four indicators to ensure a consistent result generated.

### *Data collection*

In this research, statistical data is used. Data was collected from a number of public sector organisations: Department of Health, Hospital Episode Statistics, Healthcare Commission, National Statistics and HM Treasury. The data was generated based on the daily activities of each Trust and then reported to related government bodies at the annual, seasonal or monthly basis. The data period covers nine years from 1998 to 2007

but some of the data is fragmented and only available for certain years. The indicators and the associated data are shown in Table 1.

Table 1: Indicator and data sources

| Indicators | Data source | Data period (year) | Size of sample (N) | PFI sample (N1) | Non PFI sample (N2) |
|---|---|---|---|---|---|
| Length of waiting | Hospital episode statistics | 9 (98/07) | 214(98/99)<br>197(99/00)<br>198(00/01)<br>181(01/02)<br>172(02/03)<br>168(03/04)<br>171(04/05)<br>176(05/06)<br>166(06/07) | 3(00/01)<br>10(01/02)<br>17(02/03)<br>23(03/04)<br>23(04/05)<br>30(05/06)<br>36(06/07) | 214(98/99)<br>197(99/00)<br>195(00/01)<br>171(01/02)<br>155(02/03)<br>145(03/04)<br>148(04/05)<br>146(05/06)<br>130(06/07) |
| Length of stay | Hospital episode statistics | 9 (98/07) | The same as the above | The same as the above | The same as the above |
| Patient experience | Healthcare commission | 1 (06/07) | 167 | 33 | 134 |
| MRSA infection (rate per 10,000 bed days) | Department of health | 5 (01/06) | 173 | 9(01/02)<br>18(02/03)<br>24(03/04)<br>24(04/05)<br>30(05/06) | 164(01/02)<br>155(02/03)<br>149(03/04)<br>149(04/05)<br>143(05/06) |
| Clostridium infection (rate per 1,000 bed days) | Department of health | 2 (04/05) | 178 | 23(04/05)<br>29(05/06) | 155(04/05)<br>149(05/06) |

Sample size fluctuates over the period of time is caused by data missing or incomplete data reporting from Trusts. An additional issue is the change of priorities during the study period. Government priorities are often shifting based on political climates. This is one of the reasons for a fragmented data set.

### *Statistical analysis*

This is an exploratory and comparative piece of research which aims to distinguish whether PFI hospitals differ from non PFI hospitals in regards to specific performance indicators that relate to government priorities. Group differentiation analysis is performed using standard t-test. The use of t-test is an appropriate method to test the difference between two independent groups, as the comparison between PFI and non PFI hospitals is performed by comparing the mean of each indicator. All analysis is undertaken within SPSS.

### *Limitation*

Some research argues that the reliability of those routinely collected data as part of the performance evaluation framework set out by the government is debatable. For instance, Luthi et al. (2004) used readmission as an indicator to examine the quality of care for the

patients in the hospitals. The result shows that routinely collected data is not an accurate indicator to evaluate the quality of care. Clarke (2004) concurred such results and further indicated that those data do not particularly distinguish why a patient is readmitted as well as which incidences should be eliminated from readmission. Thus, the results generated from such data will be influenced by irrelevant information. Moreover, inconsistent data collection may occur between different institutions. Hence, one may have to be cautious about using such data in cross institutional comparison. However, this research argues that any data or data collection framework likely contain systematic bias through way data being generated. This restricts a researcher's interpretation of the results. Therefore, one should be conscious of the limitation of the use of routinely collected data and make the conclusions based on what the data can explain.

## RESULTS

The first PFI hospital opened in 2000. The length of waiting for admission in the first year (2002/1) of PFI hospitals was, on average, longer than in non PFI hospitals. However, t test results at 95% confidence level show that t=0.613, df=196, p=0.540>0.05, indicating the difference is insignificant. In the following year, 2001/2, similar result can be observed. Between 2002/3 and 2006/7, the means of length of waiting in the PFI hospitals is on average lower than that in the non PFI hospitals. However, the differences are not significant. Meanwhile, the means between 1998/9 and 2006/7 show a trend that the length of waiting is decreasing in both groups except 2000/1 in PFI group.

Table 2: The length of waiting

| Length of waiting | | Mean | | | | t-Test | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Group | N | Mean | Std. deviation | Std. error mean | t | df | Sig. (2-tailed) | Mean difference | Std. error difference |
| 1998/9 | Non-PFI | 212 | 103.0802 | 33.00019 | | | | | | |
| 1999/0 | Non-PFI | 194 | 97.3402 | 40.61506 | | | | | | |
| 2000/1 | PFI | 3 | 106.0000 | 17.77639 | 10.26320 | 0.613 | 196 | 0.540 | 11.67179 | 19.03365 |
| | Non-PFI | 195 | 94.3282 | 32.83519 | 2.35138 | | | | | |
| 2001/2 | PFI | 10 | 101.8000 | 20.90614 | 6.61110 | 0.472 | 177 | 0.638 | 4.48639 | 9.51314 |
| | Non-PFI | 169 | 97.3136 | 29.61081 | 2.27775 | | | | | |
| 2002/3 | PFI | 17 | 99.9412 | 24.11812 | 5.84950 | -0.249 | 168 | 0.804 | -1.93464 | 7.76587 |
| | Non-PFI | 153 | 101.8758 | 30.96163 | 2.50310 | | | | | |
| 2003/4 | PFI | 23 | 91.3478 | 28.78069 | 6.00119 | -0.640 | 166 | 0.523 | -4.04528 | 6.32398 |
| | Non-PFI | 145 | 95.3931 | 28.08279 | 2.33215 | | | | | |
| 2004/5 | PFI | 23 | 85.6087 | 18.87697 | 3.93612 | 0.152 | 169 | 0.879 | 0.83167 | 5.45737 |
| | Non-PFI | 148 | 84.7770 | 25.06531 | 2.06036 | | | | | |
| 2005/6 | PFI | 30 | 75.0333 | 21.12930 | 3.85766 | -0.564 | 174 | 0.573 | -2.71324 | 4.80851 |
| | Non- | 146 | 77.7466 | 24.51961 | 2.02926 | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PFI | | | | | | | | | |
| 2006/7 | PFI | 36 | 70.7500 | 23.66115 | 3.94352 | - | 164 | 0.333 | -4.48846 | 4.62674 |
| | Non-PFI | 130 | 75.2385 | 24.80648 | 2.17567 | 0.970 | | | | |

In terms of the length of stay, patients in the PFI hospitals, on average, have shorter length of stay than patients in the non PFI hospitals between 2000/1 and 2006/7. However, t test at 95% confidence level shows that the differences are not statistically significant (p value>0.05). Meanwhile, the means between 1998/9 and 2006/7 show a trend of decreasing in both PFI and non PFI groups except an inflation in 2001/2 and 2002/3 in non PFI group.

Table 3: The length of stay

| Length of stay | | Mean | | | | t-Test | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Group | N | Mean | Std. deviation | Std. error mean | t | df | Sig. (2-tailed) | Mean difference | Std. error difference |
| 1998/9 | Non-PFI | 214 | 6.1565 | 1.68203 | | | | | | |
| 1999/0 | Non-PFI | 197 | 5.9655 | 1.38008 | | | | | | |
| 2000/1 | PFI | 3 | 5.3000 | 0.87178 | 0.50332 | -0.848 | 196 | 0.397 | -1.08769 | 1.28211 |
| | Non-PFI | 195 | 6.3877 | 2.21335 | 0.15850 | | | | | |
| 2001/2 | PFI | 10 | 5.6000 | 1.05409 | 0.3333 | -1.098 | 179 | 0.274 | -7.77602 | 0.70679 |
| | Non-PFI | 171 | 6.3760 | 2.21597 | 0.16946 | | | | | |
| 2002/3 | PFI | 17 | 5.5824 | 0.77801 | 0.18869 | -1.246 | 170 | 0.215 | -0.37120 | 0.29801 |
| | Non-PFI | 155 | 5.9535 | 1.19958 | 0.09635 | | | | | |
| 2003/4 | PFI | 23 | 5.5261 | 0.75812 | 0.15808 | -0.464 | 166 | 0.643 | -0.10564 | 0.22758 |
| | Non-PFI | 145 | 5.6317 | 1.04760 | 0.08700 | | | | | |
| 2004/5 | PFI | 23 | 5.1739 | 0.66279 | 0.13820 | -0.878 | 169 | 0.381 | -0.18825 | 0.21452 |
| | Non-PFI | 148 | 5.3622 | 0.99368 | 0.08168 | | | | | |
| 2005/6 | PFI | 30 | 4.9433 | 0.57336 | 0.10468 | -0.450 | 174 | 0.654 | -0.06009 | 0.13344 |
| | Non-PFI | 146 | 5.0034 | 0.99996 | 0.08276 | | | | | |
| 2006/7 | PFI | 36 | 4.7306 | 0.72302 | 0.12050 | 0.228 | 164 | 0.820 | 0.03825 | 0.16744 |
| | Non-PFI | 130 | 4.6923 | 0.92900 | 0.08148 | | | | | |

The infection control measures in this research include MRSA and Clostridium difficile infection. The mean of MRSA at 2001/2 period is not different between the two groups. From 2002/3 to 2005/6 the means of PFI group is consistently higher than non PFI group based on 10,000 bed-days calculation. However, t test shows that the differences between these two groups within this period are not statistically significant (p values>0.05 between 2001/2 and 2005/6).

Table 4: MRSA infection rate

| MRSA infection | | Mean | | | | t-Test | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Group | N | Mean | Std. deviation | Std. error mean | t | df | Sig. (2-tailed) | Mean difference | Std. error difference |
| 2001/2 | PFI | 9 | 1.5500 | 0.70388 | 0.23463 | -0.139 | 170 | 0.890 | -0.4276 | 0.30784 |
| | Non-PFI | 163 | 1.5928 | 0.90758 | 0.07109 | | | | | |
| 2002/3 | PFI | 18 | 1.9322 | 0.65000 | 0.15321 | 1.267 | 171 | 0.207 | 0.27667 | 0.21841 |
| | Non-PFI | 155 | 1.6555 | 0.89868 | 0.07218 | | | | | |
| 2003/4 | PFI | 24 | 1.7817 | 0.70927 | 0.14478 | 0.674 | 171 | 0.501 | 0.11764 | 0,17449 |
| | Non-PFI | 149 | 1.6640 | 0.80559 | 0.06600 | | | | | |
| 2004/5 | PFI | 24 | 1.7900 | 0.60860 | 0.12423 | 1.247 | 171 | 0.214 | 0.20745 | 0.16642 |
| | Non-PFI | 149 | 1.5826 | 0.77711 | 0.06366 | | | | | |
| 2005/6 | PFI | 30 | 1.8380 | 0.60545 | 0.11054 | 1.959 | 171 | 0.052 | 0.28583 | 0.14588 |
| | Non-PFI | 143 | 1.5522 | 0.74877 | 0.06262 | | | | | |

A similar result appears with the clostridium difficile infection rate. PFI group's means in 2004 and 2005 were higher than non PFI group's. However, t test shows that these differences are statistically insignificant (p values>0.05). Infection rate was calculated based on per 1,000 bed-days and a patient age of over 65 years.

Table 5: Clostridium difficile infection rate

| Clostridium difficile infection | | Mean | | | | t-Test | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Group | N | Mean | Std. deviation | Std. error mean | t | df | Sig. (2-tailed) | Mean difference | Std. error difference |
| 2004 | PFI | 29 | 2.3852 | 0.94384 | 0.17527 | 1.219 | 160 | 0.225 | 0.26316 | 0.21594 |
| | Non-PFI | 134 | 2.1220 | 1.07621 | 0.09297 | | | | | |
| 2005 | PFI | 23 | 2.0443 | 0.61050 | 0.12730 | 1.013 | 161 | 0.312 | 0.19550 | 0.19293 |
| | Non-PFI | 139 | 1.8488 | 0.89006 | 0.07549 | | | | | |

Patient experience includes five indicators. The results show that three out of five patient experience indicators in the PFI group have statistically lower scores than non PFI group in 2006/7. This means that patients in the PFI hospitals seem to have less satisfaction in 'access and waiting' (p=0.05), 'safe, high quality, coordinated care' (p=0.027<0.05) and 'building relationships' (p=0.021<0.05) than patients in the non PFI hospitals. T test results show that differences in the indicators 'better information, more choice' and 'clean, comfortable, friendly place to be' are statistically insignificant (p=0.309>0.05 and p=0.26>0.05).

Table 6: The experiences of patients 2006/7

| Patient experience | | Mean | | | | t-Test | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Indexs | Group | N | Mean | Std. deviation | Std. error mean | t | df | Sig. (2-tailed) | Mean difference | Std. error difference |
| Access and waiting | PFI | 33 | 83.6962 | 3.17125 | 0.55204 | -1.973 | 165 | 0.050 | -1.41500 | 0.71714 |
| | Non-PFI | 134 | 85.1101 | 3.380454 | 0.32866 | | | | | |
| Safe, high quality, coordinated care | PFI | 33 | 67.8367 | 4.16714 | 0.72541 | -2.234 | 165 | 0.027 | -1.73953 | 0.77866 |
| | Non-PFI | 134 | 69.5762 | 3.96725 | 0.34272 | | | | | |
| Better information, more choice | PFI | 33 | 66.5021 | 4.87322 | 0.84832 | -1.021 | 165 | 0.309 | -0.95086 | 0.93165 |
| | Non-PFI | 134 | 67.4530 | 4.77484 | 0.41248 | | | | | |
| Building relationships | PFI | 33 | 81.8903 | 3.54864 | 0.61774 | -2.331 | 165 | 0.021 | -1.48380 | 0.63662 |
| | Non-PFI | 134 | 83.3741 | 3.20684 | 0.27703 | | | | | |
| Clean, comfortable, friendly place to be | PFI | 33 | 76.2352 | 2.83877 | 0.49417 | -2.252 | 165 | 0.26 | -1.50216 | 0.66698 |
| | Non-PFI | 134 | 77.7373 | 3.56017 | 0.30755 | | | | | |

## DISCUSSION

The indicator “length of waiting” appears to show a decreasing trend from 1998 onwards in both PFI and non-PFI groups. Also, the means of the length of waiting in the PFI group is lower than that in the non-PFI group between 2002/3 and 2006/7. The reasons of causing a decreased trend in the length of waiting could be explained by two factors. Firstly, cutting down waiting list is a priority target for government. This would decrease the length of waiting gradually over the period of time. Secondly, the occupancy of beds has been managed in more efficient ways. This also decreases the second indicator, the length of stay, as Table 3 shows a trend since 1998. However, in the PFI group this trend has been consistently carried out over time. In contrast, there is a fluctuation that appears in 2000 and 2001 in the non-PFI group, even though in the long term a decreasing trend can be observed.

Interestingly, PFI hospitals have been criticised (e.g. Broadbent et al., 2003) that they provide smaller numbers of beds. This may result in an increase of the length of waiting. However, data does not support such assumption. Conversely, it shows a consistently decreasing trend in the PFI group in both the length of waiting and stay. A possible reason for such a result may be attributed to PFI hospitals benefiting from importing private sector management skills and adopting new facilities which enable them to

efficiently manage bed occupancy and cut down waiting time. However, this justification requires further research to provide evidence.

Although statistical results show that the infection rates of MRSA and Clostridium difficile are no different between PFI and non PFI hospitals, this result raises a question why new built hospitals are not performing better than old hospitals in infection control. They are expected to have a higher performance due to the new installations and the application of new technologies. The arguments (e.g. Pollock et al., 2001; Pollock and Gaffney, 1997) that have emerged suggest that the designs of PFI hospitals have to be affordable and therefore, reduction of bed number or more compact design are adopted. Thus, the distance between the beds has to be compromised (Wilson and Ridgway, 2006). This may be against professional advice from infection control professionals and increase the risk of cross-infection (Kibbler et al., 1998). Furthermore, cleaning is considered an important determinant in controlling infections. Cleaning work in the PFI hospitals is outsourced to the PFI consortiums. Therefore, whether outsourcers follow the guidelines and work to the standard is unclear. Moreover, air flow and air pressure are considered important factors associated with infection control within the hospitals. Both need to be taken into consideration at the planning and designing stages of a hospital. However, the above causes are theoretical attributions. Further research may be required to explore what the actual causes are.

In terms of patient experience, Table 6 shows that PFI hospitals in general obtain a lower score than non PFI hospitals in the three out of five indicators. This may be a caution that PFI hospitals do not adequately address patient expectation. Especially, a conflict appears in the first indicator, access and waiting. Although Table 2 shows that the length of waiting in the PFI group is insignificantly shorter than it in the non PFI group, PFI group obtains a lower score in this indicator than non PFI group. One possible explanation is that most new built PFI hospitals are located in the suburbs which may cause issues in relation to access. In the survey, waiting time and access are not specifically separated. This causes an ambiguity in the explanation of the differences.

Moreover, the results of ‘safe, high quality, coordinated care’ and ‘building relationships’ show that patients seem to be more satisfied in the non PFI hospitals. This may show that new built PFI hospitals may still be at the stage of adapting to the new systems and environment. Therefore, it requires a continuous observation to see whether this is improved over time.

Furthermore, although t test results in ‘clean and comfortable place to be’ and infection rates show insignificant differences between PFI and non PFI groups, it may be worth noting that there is a correlation. Hospital acquired infections can be caused by many factors such as uncleanliness, staff training, visitors to patients, etc. This raises the questions whether outsourcing of PFI hospitals’ cleaning work is appropriate or whether outsourcers follows the guidelines of hospital cleaning theist related standards.

The overall results from patient experiences show that there is a room for PFI hospitals to improve their services and provide a clean and comfortable place for the patients.

## CONCLUSION

In conclusion, this research found that there are only three indicators in the patient experience category that produce statistically significant results. However, it is unclear what factors cause the differentiations between the groups in these three indicators. All other indicators appear statistically insignificant. This can be interpreted that there is no significant difference between two groups in performance according to governmental performance indicators. This may result from two factors. Firstly, healthcare performance is a complex system and derives from many attributes which may be correlated and difficult to be clearly separated. Secondly, the nature of data also causes a limitation on the interpretation of the results as data itself contains systematic errors which cannot be eliminated. This may deteriorate the generalisation of the results. Therefore, this paper suggests further research to be implemented, which may seek for the explanations of what causes difference/no difference in the results of this research. It also raises a number of questions regarding the type of indicators that may adequately describe the performance of hospitals. Whilst the data sets may have flaws, these are indicators that are accepted to tell government about performance issues. Whilst difference can not be confidently determined, it seems that there is a need to find appropriate indicators to assess and evaluate the performance of hospitals in a more accurate and appropriate format.

## REFERENCES

Akintoye, A., Hardcastle, C., Beck, M., Chinyio, E. and Asenova, D. (2003) Achieving best value in private finance initiative project procurement. Construction Management and Economics, 21, 461-470.

Akintoye, A., Taylor, C. and Fitzgerald, E. (1998) Risk analysis and management of private finance initiative projects. Engineering, Construction and Architectural Management, 5 (1), 9-21.

Austin, P. C., Naylor, C. D., Tu, J. V. (2001) A comparison of a Bayesian vs. a frequentist method for profiling hospital performance. Journal of Evaluation in Clinical Practice, 7 (1), 35–45.

Bradley, E. H., Herrin, J., Mattera, J. A., Holmboe, E. S., Wang, Y., Frederick, P., Roumanis, S. A., Radford, M. J. and Krumholz, H. M. (2005) Quality Improvement Efforts and Hospital Performance: Rates of Beta-Blocker Prescription After Acute Myocardial Infarction. Medical Care, 43(3), 282-292.

Broadbent, J., Gill, J. and Laughlin, R. (2003) Evaluating the private finance initiative in the national health service in the UK. Accounting, Auditing & accountability Journal, 16 (3), 422-445.

Clark, A. (2004) Readmission to hospital: a measure of quality or outcome? Qual Saf Health Care, 13, 10-11.

Department of Health (2004) National Standards, local action: health and social care standards and planning framework2005/6 - 2007/8. London: Stationary Office

Department of Health (2006) Our health, our care, our say. London: Stationary Office.

DesHarnais, S. I., McMahon, L. F., Wroblewski, Jr. R. T. and Hogan, A. J. (1990) Measuring Hospital Performance: The Development and Validation of Risk-Adjusted Indexes of Mortality, Readmissions, and Complications. Medical Care, 28 (12), 1127-1141.

Gaffney, D., Pollock, A. M., Price, D. and Shaoul, J. (1999) The private finance initiative: NHS capital expenditure and private finance initiative-expansion or contraction? BMJ, 319, 48-51.

Health Protection Agency (2006) Mandatory surveillance of healthcare associated infections report 2006. London: Health Protection Agency.

Iezzoni, L. I., Shwartz, M., Ash, A. S., Hughes, J. S., Daley, J., Mackiernan, Y. (1996) Severity Measurement Methods and Judging Hospital Death Rates for Pneumonia. Medical Care, 34(1), 11-28.

Kibbler, C.C., Quick, A. and O'Neill, A.M. (1998) The effect of increased bed numbers on MRSA transmission in acute medical wards. Journal of Hospital Infection, 39(3), 213-219.

Luthi, J. C., Burnand, B., McClellan, W. M., Pitts, S. R. and Flanders, W. D. (2004) Is readmission to hospital an indicator of poor process of care for patients with heart failure? Qual Saf Health Care, 13, 46-51.

Mallak, L. A., Lyth, D. M., Olson, S. D., Ulshafer, S. M., Sardone, F. J. (2003) Culture, the built environment and healthcare organizational performance. Managing Service Quality, 13(1), 27-38.

National Audit Office (2000) The management and control of hospital acquired infection in acute trusts in England. London: Stationary Office.

Pollock, A. and Gaffney, D. (1997) Capital charges: a tax on the NHS. British Medical Journal, 317, 157-158

Pollock, A., Shaoul, J., Rowland, D. and Player, F. (2001) Public services and the private sector: a response to the IPPR. London: The Catalyst Trust Ltd.

Pollock, A. M., Shaoul, J., and Vickers, N. (2002) Private finance and 'value for money' in NHS hospitals: a policy in search of a rationale? BMJ, 324, 1205-1209.

Romano, P. S., Zach, A., Luft, H. S., Rainwater, J., Remy L. L. (1995) The California Hospital Outcomes Project: using administrative data to compare hospital performance. Joint Commission Journal on Quality Improvement, 21(12), 668-682.

Rosenthal, G. E., Hammar, P. J., Way, L.E., Shipley, S.A., Doner, D., Wojtala, B., Miller, J. and Harper, D. L. (1998) Using hospital performance data in quality improvement: the Cleveland Health Quality Choice experience. Joint Commission Journal on Quality Improvement, 24(7), 347-360.

Shaoul, J. (2005) A critical financial analysis of the private finance initiative: selecting a financing method or allocating economic wealth? Critical Perspective on Accounting, 16, 441-471.

Thomas, J. W. and Hofer, T. (1999) Accuracy of Risk-Adjusted Mortality Rate As a Measure of Hospital Quality of Care. Medical Care, 37(1), 83-92.

Werner, R. M. and Bradlow, E. T. (2006) Relationship Between Medicare's Hospital Compare Performance Measures and Mortality Rates. JAMA, 296, 2694-2702.

Wilson, A. P. R. and Ridgway, G. L. (2006) Reducing hospital-acquired infection by design: the new University College London Hospital. Journal of Hospital Infection, 62(3), 264-269.