London School of Economics and Political Science
Department of Social Policy
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Name: Matthias Maria Loening

PhD Dissertation

Ownership, Efficiency and Quality: A comparison between National Health Service and Independent Sector Treatment Centres in England

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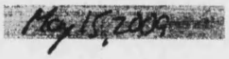
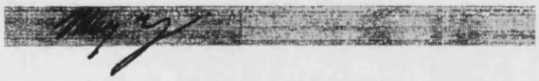
Date  Signature 

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Abstract

The Treatment Centre (TCs) Programme in England has been put forward as part of a government strategy to add capacity, to improve quality and access to care to NHS patients and to provide competitive incentives to improve quality within the NHS. At present, two types of TCs are being rolled out: the Independent Sector Treatment Centres (ISTCs), managed by the private sector, and the NHS Treatment Centres (NHS TCs), managed by the National Health Service (NHS).

This dissertation focuses on a number of important questions raised by the increase in the number of these Treatment Centres in England. Are there differences between the ISTCs and NHS TCs in terms of efficiency? Are there differences between the ISTCs and NHS TCs in terms of quality? Are there differences in the organisational, managerial and technological approach between the Independent Sector Treatment Centres and the NHS Treatment Centres? And how does the difference in their ownership structure relate to any differences in performance and approach found between the ISTCs and NHS TCs?

A quantitative and qualitative research methodology is used. Basic descriptive analysis, weighted mean difference and regression analyses are conducted for the quantitative approach using Dr. Fosters 2007 patient record information. The purpose of the quantitative analysis is to establish whether there are quantifiable differences in performance between the Treatment Centres in terms of efficiency and quality. The qualitative analysis is designed to open the 'black box' of the quantitative results and to investigate in depth the nature of the underlying relationships revealed by the quantitative analysis. It uses a comparative case study design as the primary approach with interviews and site visits to 18 different treatment centres and hospitals.

The quantitative evidence suggests that ownership may play an important role in facility performance. The qualitative evidence shows that there are differences in the actual organisational structure and operations of these treatment centres which affect performance and suggests that ownership is indeed the determining factor for these differences, although due to the methodological approach of the dissertation, the evidence cannot be entirely conclusive in how and to what extent this links back to differences in the quantitative evidence.

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Acknowledgements

The original topic was an entirely different topic of research. This research was to revolve around the interface of the private sector in the delivery of public health care services (e.g. public-private partnerships). My revised dissertation plan was to assess the Treatment Centre Programme, attempt to stay away from the ownership aspects and assess whether the treatment centre focus made a difference in performance. During the journey, the evidence became clear and came back to my original interest in ownership, how ownership matters and how the private sector can work within public health systems.

There are many people I would like to thank. Naturally, I owe my greatest thanks, to Professor Julian Le Grand for his continued guidance, keeping me on track and motivated throughout this intellectual journey. I would also like to express gratitude to Professor Alistair McGuire and Zack Cooper for their quantitative support. And Julia for the moral support and keeping little Evan occupied so that I could block off hours of time. And number 2, who's imminent arrival has set the deadline for finalizing this document. I would also like to thank all those from the NHS and Independent Sector who have spent countless hours with me. Their time is valuable and it is their insight which provides the basis for the research.

Abbreviations

ALOS	Length Of Stay
AMI	Acute Myocardial Infarction
AP	Aesthetic Practitioner
ASA	American Society of Anaesthetists
BMI	Body Mass Index
CABG	Coronary Artery Bypass Graft
CCMU	Central Contract Management Unit
CD	Commercial Directorate
CMI	Case Mix Index
CMS	Center for Medicare and Medicaid Services
CON	Certificate of Need
DH	Department of Health
DNA	Did Not Attend
DRG	Diagnosis Related Group
FCE	Finished Consultant Episodes
FES	Functional Endoscopic Sinus
FP	For Profit
FT	Foundation Trust
GAO	General Accounting Office
GP	General Practitioner
HES	Hospital Episode Statistics
HHS	Us Department of Health and Human Services
HMO	Health Maintenance Organisation
HRG	Health Resource Groups
HVH	High Volume Hospital
ICU	Intensive Care Unit
IDS	Integrated Delivery System
IMD	Index for Multiple Deprivation
IS	Independent Sector
ISTC	Independent Sector Treatment Centre
KPI	Key Performance Indicators
LVH	Low Volume Hospital
MedPAC	Medicare Payment Advisory Commission
NAO	National Audit Office
NATN	National Association of Theatre Nurses
NCHOD	National Centre for Health Outcomes Development
NFP	Not For Profit
NHS TC	National Health Service Treatment Centre
ODP	Operating Department Practitioner
OLS	Ordinary Least Squares
OP	Outpatient
OR	Operating Room
PACS	Picture Archiving and Communication Systems
PACU	Post Anaesthesia Care Unit
PbR	Pay by Results
PCA	Patient Control Anaesthesia
PCT	Primary Care Trust
SHA	Strategic Health Authority
VFM	Value For Money
VIF	Variance Inflation Factor
WMD	Weighted Mean Difference

PART I

Introductory Chapters

Chapter 1

The Treatment Centre Programme: The Context

It is better to debate a question without settling it than to settle a question without debating it.

Joseph Jouber

1.0 Introduction

Change is rarely unopposed and the Treatment Centre Programme in England – a programme designed to expand the country's healthcare access and to bolster the quality of its services (Department of Health 2005) – has not been free of controversy. The programme envisioned new private sector (commonly referred to as the independent sector) treatment centres providing care to 250,000 patients per year[1] with an additional 170,000 cared for by public sector (England's NHS) treatment centres (Commercial Directorate 2005; Department of Health 2005; Timmins 2005; Timmons 2005; UNISON 2005; CBI 2008). The programme's supporters hailed the advantages of the treatment centres' 'focused' approach to healthcare, which they argued would improve quality of care while reducing costs. Opponents of the programme feared the new treatment centres would simply 'cherry pick' the most profitable procedures and patients from the NHS, disrupt continuity of care, reduce training opportunities for young medical practitioners and fragment the healthcare system into a large number of small operations, each duplicating the efforts and costs of the others (Royal College of Physicians 2003; British Medical Association 2005; UNISON 2005).

Furthermore, there has also been considerable misrepresentation of the facts of the TC Programme as part of the political tensions surrounding it. Recent examples include a news story in the Times and a column by Polly Toynbee of the Guardian highly critical of the ISTC programme, both of which cited a study alleging poor performance with respect to hip replacements by an ISTC. In fact the Treatment

[1] The NHS is in the process of launching a Wave 2 program that will provide additional capacity for approximately 125,000 patients per year.

Centre concerned, Weston-Super-Mare was an NHS TC, and had no connections with the independent sector[2]. The Toynbee article also made other errors, notably describing United Healthcare as one of the ISTC owners, whereas in fact United had not even bid.

This dissertation focuses on England's experience and whether the Treatment Centre Programme or something similar can be an effective policy mechanism for attaining a national health system's goals and objectives. It is important to note that while there are Treatment Centres in Scotland, Wales and Northern Ireland, this dissertation only concerns the Treatment Centre Programme in England. Hence, references to the NHS are intended to refer to the English NHS.

The overriding theme of this dissertation has been the assessment of the evidence related to the Treatment Centre Programme with the view to determining whether the Independent Sector Treatment Centres (ISTCs) deliver higher performance than NHS Treatment Centres (NHS TCs), and, if so, why. More specifically, the dissertation focuses upon the following research questions:

- Are there differences between the ISTCs and NHS TCs in terms of efficiency?
- Are there differences between the ISTCs and NHS TCs in terms of quality?
- Are there differences in the organisational, managerial and technological approach between the ISTCs and NHS TCs?
- If such differences exist, how can they be explained?

1.1 The Context

For many years, UK governments have been trying to cut the time NHS patients must wait for elective procedures. It has aimed to do this in part by encouraging the emergence of a wider range of healthcare providers, so as to increase capacity, to encourage innovation and the improvement of services, and to give patients more choice. An important element of this policy was the creation of treatment centres capable of providing a limited range of planned – that is, non-emergency – surgery and diagnostic services in both England's NHS and the independent sector. It was expected that separating the two types of activity would mean that planned care could

[2] 'NHS paying a high price for bungled hip replacements Times 22nd September 2009. 'Beware the zealots Guardian (20th October 2009) . See also replies by Julian Le Grand (Guardian Letters 27th October 2009) and Ken Anderson (Guardian Response 30th October 2009). A further twist to this tale is that the study concerned was undertaken by surgeons working in Cardiff: a competitor losing business to Weston.

be reliably delivered without the risk that facilities would be requisitioned for emergency procedures.

There are two ways that Treatment Centres are operated in England. Some are run by the NHS Trusts and Primary Care Trusts (PCTs). Currently, there are well over 40 NHS Treatment Centres, managed by the National Health Service (NHS) (Department of Health 2005; Department of Health 2009). Others have been commissioned from the independent sector (ISTCs) who are contracted to run these facilities. For the first wave of tenders, 24 ISTCs were initially planned (Healthcare Commission 2007). Both types of treatment centre are run to treat NHS patients.

The total size of the ISTC programme represents an investment of only 1% of the NHS' total budget. But few initiatives have met such sustained opposition, both professional and political. This was largely because the programme represented a strategic shift in NHS attitudes towards the private sector. The core objectives of the new ISTC policy were to:

- help the NHS to reduce waiting times;
- broaden the range of available service providers and increase patient choice
- promote new service models;
- contribute to the long-term development of relationships between the independent sector and the NHS in support of their efforts to reach local NHS targets (Commercial Directorate 2005; Department of Health 2005; Timmins 2005; Timmons 2005; UNISON 2005).

An additional key motivation for the inclusion of the independent sector in the Treatment Centre Programme was to allow for new market entrants, increase competition and to bring down costs for hospital services. Until the initiation of the program, private sector involvement in NHS clinical services was largely confined to surgery contracted out to private hospitals and private providers on NHS premises. This began to change in 2003, when the government launched the first wave of specialist diagnostic and treatment centres to be run by the private sector and the NHS.

The first wave, commonly referred to as Wave I, which this dissertation assesses, sought to increase the permanent capacity for elective surgery and diagnostic services in England. The aim was not only to reduce waiting times for elective procedures but also to expand choice and to increase productivity through new models of patient care. Unlike the existing NHS TCs, expansion was to be achieved by encouraging the

introduction of private, or independent sector, companies establishing facilities. Emphasis was on increasing permanent capacity, marking a strategic shift on purchasing from the private sector for public health care provision. In years past, the NHS had contracted with the private sector but this was on an ad hoc basis. Further, emphasis was not just to create additional physical (e.g. infrastructure) capacity in England but also to develop additional human capacity. As a result, an important aspect to this programme was the fact that these facilities were to employ staff not currently working for the NHS.

The first of these ISTCs, focusing on low risk elective surgeries and diagnostic services, opened in 2003 (Browne, Jamieson et al. 2008). In total, 32 ISTC schemes were to open by 2008 (Anderson 2006) caring for an estimated 250,000 patients per year (Commercial Directorate 2005). However, as of early 2008, there were 23 centres plus three mobile units in operation under Wave I delivering in excess of 170,000 operations annually (CBI 2008). The main winners in this first wave were companies from South Africa, the United States and Canada. England-based private hospital companies that had expected to share in this initiative lost out largely because they were too expensive.

The first impact of the ISTCs was on the existing English private sector. After losing out in the first wave of ISTCs, the England based companies Capio and Nuffield Hospitals, who see the NHS as their major source of business, cut their prices to close to the NHS tariff. Nuffield also bought a company that makes mobile operating theatres. Regardless of whether or not the ISTC programme has been successful in its other goals, it has driven down the cost of private hospital services to the NHS. The NHS paid a premium of up to over 40% for private beds until the launch of the Wave 1 tenders (UNISON 2005).

Clearly, the first wave of the ISTC programme has been shown to be an agent of change for the way healthcare is delivered in England. If physical capacity was the only issue, it is likely the incumbent private hospital market (BMI, Bupa, Capio, Nuffield, etc.) could have met the demands of the healthcare market. However, the Government intended for the ISTC programme to be a lever of change in the NHS. A key question, however, was what volume of work should be let to the Independent Sector Treatment market to ensure reasonable prices and thus continue to lever this change in the NHS (Commercial Directorate 2004)?

To answer this question the Commercial Directorate commissioned a report to aid in the defining and planning of the next wave of ISTC procurements. The report was approached both from the perspective of creating a new, competitive healthcare market and from the perspective of transforming England's existing independent market (Commercial Directorate 2004). To adequately address these questions, the type of market desired had to be decided upon. There were different types of 'sustainable' markets that could be created – a small ISTC market with niche players, a low-cost ISTC market, or whole pluralistic markets with 3-4 national providers – and it was expected that the independent sector would adapt and react to the different opportunities presented by each market in a way that made commercial and financial sense to their investors (Commercial Directorate 2004).

Prior to the launch of the first wave, the private medical provider market in England could be characterised as a somewhat niche high-cost, low-throughput business where the private medical insurers were the primary customers. With such a small private sector, the NHS paid in excess of 40% of current HRG tariff prices to augment local capacity on average—i.e. spot purchasing (Commercial Directorate 2004)

A second wave, Wave II, of tenders was announced shortly after the launch of the first wave. However, the procurement of Wave II ISTCs by the Department of Health has been beset with delays and uncertainties. Of the 27 schemes originally intended, only seven are going ahead. This second wave now will likely to amount to less than half of the initially planned £700m (250,000 patients per year) (Timmins 2007; CBI 2008).

Though the Wave II tenders have been scaled down significantly, we now have the beginnings of a 'mid-tier market' where independent sector providers have entered England based on a high-throughput, low-cost business model with the NHS as the primary customer. We also have evidence that the incumbent providers are 'retooling' their businesses to be far more competitive. In both cases, we have seen the introduction of a number of innovations that allow these organisations to operate much more efficiently and deliver strong results (Commercial Directorate 2004).

The impact on the NHS has been more controversial. UNISON and other critics from health professions expressed concern about the impact of these centres on existing NHS resources (Lister 2005; UNISON 2005). Some of the critics wondered why the government was providing new money preferentially to the private sector,

rather than adopting the 'cheaper and easier policy' of expanding NHS provision. These critics asserted that the private health care sector has always been a "*small and marginal operation, feeding off historic wait lists and poaching NHS staff*" (Lister 2005). UNISON argued that the experiences of other countries show that the private sector is "*never cheaper or better value*" (UNISON 2005).

In the summer of 2006, the Parliamentary Health Committee published an inquiry on whether the primary objectives of the ISTC Programme had been met. The Committee concluded that ISTCs had not yet made a major direct contribution to increasing capacity. The Committee concluded that ISTCs did have a significant effect on the spot purchase price and increased patient choice via offering more locations for care and earlier treatments. However, there was concern that patients were not offered informed choice without information relating to clinical quality (Health Committee 2006).

The Committee found ISTCs embodied good practice and introduced innovative techniques, but it was unclear whether that NHS facilities had adopted in any systematic manner these practices and techniques from the ISTCs. A number of concerns were raised also about the ISTC programme by the professional medical bodies and others. However, there was no hard, quantifiable evidence to prove that standards in ISTCs differed from those in the NHS (Health Committee 2006).

The Committee found that waiting lists declined since the introduction of ISTCs, but it was unclear how much is a direct result of the introduction of the ISTC Programme and how much is due to additional NHS spending and the emphasis placed by the Government on waiting list targets over the study period (Health Committee 2006).

Competition was also assessed. The Committee found that the threat of competition from the ISTCs may have had a significant effect on the NHS, but the evidence is largely anecdotal and could not be quantified (Health Committee 2006).

Key arguments raised by opponents to the ISTC Programme included[3]:

- ISTCs, run for the benefit of 'profit maximising' shareholders, would charge higher costs, and take on only the most minor and uncomplicated surgeries.

3 The proceedings of the House of Commons Health Select Committee meetings themselves have been challenged. In the book titled Confuse & Conceal: The NHS and Independent Sector Treatment Centres by Stewart Player and Colin Leys (2008), the authors suggest that the Health Select Committee tried to assess the programme early on in so that it would not be revealed that the TC programme was really a bridge-head to a private sector take-over of the NHS.

- The NHS would be left to deal with more complex cases for disproportionately less money;
- Far from delivering new and expanded services and capacity the private sector would divert vital funds from the NHS to the commercial sector.
- The centres would inevitably draw off NHS staff and resources, and do little to address the problem of staff shortages;
- The diversion of resources would cut across the necessary training of specialist doctors and nursing staff, jeopardising medical education;
- Any apparent increase in private sector provision would entail corresponding reductions and cancellations of plans to expand and develop NHS services;
- Any eventual reduction in waiting times that may arise after such schemes are introduced would be achieved only at the expense of higher costs and longer delays than would have been necessary for an expansion of mainstream NHS care;
- Rather than enhancing patient choice, the ISTC Programme may in fact risk destabilising and forcing the closure of popular local units, perhaps even of whole hospitals that offer comprehensive care, including emergency services, to a wide section of the public.
- Prior to committing to second wave, a full and objective public evaluation of the impact of the first round of treatment centres, including their impact on the wider NHS, should be commissioned.

So it is apparent that the ISTC programme raises a number of key issues, most of which can only be settled by empirical investigation. But perhaps the most important of these is the question of ownership. Does the fact that the ISTCs are independently owned and operated affect their performance as providers to NHS patients? Is there evidence to support the belief held by many that private providers are more efficient and provide services of higher quality than public ones? If differences in efficiency and quality do exist, what causes them? What, ultimately, is the role of ownership in determining, the performance of health care providers? It is to these questions that this thesis is addressed.

1.2 The Research Questions

The research aims to answer to the following questions:

R.1: Are there differences between the ISTCs and NHS TCs in terms of efficiency?

R.2: Are there differences between the ISTCs and NHS TCs in terms of quality?

R.3: Are there differences in the organisational, managerial and technological approach between the ISTCs and the NHS TCs? If so, do these explain any observed differences between the ISTCs and the NHS TCs in terms of efficiency and quality?

R.4: If such differences exist, how can they be explained? In particular how does the difference in their ownership structure relate to the differences in performance found between the ISTCs and NHS TCs? Or could there be various alternative, or confounding, influences which may affect the conclusions suggested by the evidence?

First, the quantitative evidence will be assessed as to whether there are differences between the ISTCs and NHS TCs in terms of efficiency (R.1). The evidence will also be assessed as to whether there are differences between the ISTCs and NHS TCs in terms of quality outcomes (R.2). The quantitative methodological approach is intended to conduct an initial assessment on the specific issue of treatment centre performance and initiate the hypothesis that there are differences in performance between the Treatment Centres. It is important to note that the quantitative analysis is simply to obtain initial correlations and establish that there are differences in performance.

Qualitative evidence will then be explored to investigate whether there are differences in the organisational, managerial and technological approach between the ISTCs and the NHS TCs. If so, do these explain any observed differences between the ISTCs and the NHS TCs in terms of efficiency and quality (R.3)?

Lastly, qualitative evidence on the role of ownership will be assessed, specifically to ascertain how it may drive the differences in performance found between the ISTCs and NHS TCs (R.4). The researcher theorises there are a number of potential reasons for these differences, such as: ownership; the competitive effects in the market; differences in payers and payment methodologies; active selection by ISTCs of patients with lower risk than the NHS TCs; and integration of some treatment centres

with larger hospitals. The importance of these factors will be further assessed within this dissertation.

1.3 Dissertation Plan

The dissertation plan is as follows. Following this introductory chapter, Chapter 2 establishes a theoretical framework to provide a context for the research question and a review of the literature investigating the effects of Treatment Centres on efficiency and quality. In this chapter, there is an additional section on the theoretical underpinnings of ownership and competition, and how they relate to the health sector. As most of the existing literature is from the United States, data is heavily weighted toward that country. However, where possible, research is presented from England, as there is some evidence from the introduction of the Internal Market in the 1990s and GP-fundholding schemes, as well as initial reports on the performance of the Treatment Centres.

Chapter 3 sets forth the research design and methodology to be used. Three quantitative approaches are used to ascertain the relationship between the type of provider and health outcomes, as well as the provider's ownership and health outcomes. Three approaches of quantitative analysis are used: basic descriptive statistics, weighted mean differences and regression.

The quantitative analysis is complemented by a qualitative case study approach. The use of a qualitative approach is intended to provide evidence and conclusions made from the quantitative approach and to help draw out meaningful conclusions.

Chapter 4 uses quantitative methods to provide empirical evidence on the specific issue of treatment centre performance. The research is geared to providing answers to whether there are differences between the ISTCs and NHS TCs in terms of efficiency and quality. Because the Treatment Centre Programme encompasses not only ISTCs, but also NHS Treatment Centres (NHS TCs), we have an opportunity quantitatively to assess the performance of IS and NHS Treatment Centres alongside NHS Trust Hospitals and Independent Sector General Hospital Providers and as a result uncover whether there are advantages in terms of efficiency and quality that may be associated with differing ownership structures (public or private) and facility type (treatment centre or hospital). An initial analysis is undertaken by analysing basic descriptive statistics. This is followed by pooling the mean differences between groups. Multivariate regression analyses are then undertaken in order to assess the predictive

value of these mean differences, to control for potential confounding factors and to determine the significance of variables such as ownership status, treatment centre focus, age and deprivation. It is important to note that this analysis is not intended to explain causation or prediction, but rather to initiate the hypothesis that there are differences in performance between the Treatment Centres and obtain initial correlations and ensure that there are differences in performance. This chapter is to support the initial hypothesis and to justify the rest of the thesis through ensuring that there is a difference to explain.

Chapter 5 is the first of two chapters that will add to the research literature on England's Treatment Centre Programme by providing qualitative evidence on the differences in performance between the ISTCs and NHS TCs. Unlike much economic research, which tends to be satisfied with statistical relationships between given phenomenon even if the causal nature of the relationship remains hidden in a 'black box,' this chapter will attempt to uncover the reasons why we find differing performance between IS and the NHS TCs. In a sense, this chapter will attempt to 'open' the black box of the institutions, and try to identify exactly what the proximate factors are that explain the differences in outcomes.

Chapter 6 takes the argument a stage further by trying to identify the causes of those differences found in Chapter 5, focusing particularly on the role of ownership. There are a number of potential explanatory variables that must be discounted before it can be asserted that ownership is indeed the primary explanatory variable for differences in performance. Other potential explanatory variables that could account for the differences in performance are competition, type of payer and method of reimbursement, case mix selection, physical and organisational integration and differences in ownership. The chapter uses qualitative evidence to disentangle the correlations identified in the quantitative results and to gain insight into the causal relationships involved.

Chapter 7 concludes the research by drawing together the evidence reviewed to contribute to an overall assessment of the policy and implications of the Treatment Centre Programme. The limitations of the research and areas of further research are put forward. A key tenet of this chapter is that the evidence from England will allow for a broader discussion of the global role of Treatment Centres, as well as the independent sector, in the delivery of care for public patients, as other countries attempt to deal with the policy issues surrounding these facilities. Treatment Centres

(also known as specialty hospitals, outpatient surgery centres, ambulatory surgery centres, and day case centres) will undoubtedly increase in numbers over the coming years, and difficult policy decisions will have to be confronted with regard to their role in a country's health system.

1.4 Summary

The TC debate should not be regarded as merely the 'topic du jour.' The real conflict is just beginning, with large and powerful hospitals on one hand, and small upstart treatment centres on the other. As hospitals typically receive the largest proportion of funding in any country's health sector, they most often represent a powerful lobbying force. Therefore, the topic of emerging, alternative methods of access to health care quickly becomes politicised. Compounding this political debate is the notion that policy-makers are searching for ways to control costs, while patient consumers are increasing their demands for improved access and better quality of care. Preserving the traditional model of hospital care is increasingly becoming difficult.

Today we are seeing this emergent, and increasingly conflicted, intersection of policy, economics and business. From the policy standpoint, questions arise over efficiency, equity, quality and choice, against the backdrop of ever-rising costs. From the economic standpoint, questions arise over new and increasingly market-oriented ways to finance increasing demands, largely via the pricing mechanisms of competition and choice. From the business standpoint, questions arise over whether the independent sector and individual physicians should be allowed to provide and own these services, what types of services they should be commissioned, and how they should be remunerated for service.

Questions surrounding Treatment Centres within a health system are only beginning to be asked by policy-makers world wide. Of course, each health system is different, with varying policy goals and objectives, but all share common challenges: managing increasing demand, containing rising costs, and, ideally, improving access and quality. This dissertation will add to the literature of Treatment Centres by providing empirical evidence on issues of efficiency and quality, and their relationship to structures of ownership.

Chapter 2

Literature Review and Theoretical Framework

We are recorders and reporters of the facts—not judges of the behavior we describe.

Alfred C Kinsey, 1956

2.0 General Overview of the Theory and Research Literature

This chapter reviews the research evidence concerning efficiency, quality, ownership and competition as related to Treatment Centres. 'Treatment Centre' is the UK's terminology for a facility that provides health care services of an elective nature that can be provided on an outpatient, day-case or short-stay basis. Other terms for these types of facilities exist, including ambulatory surgery centre (ASC), outpatient surgery centre, day case centre and specialty hospital. These terms have varying definitions[1]. For the purposes of this research, a 'treatment centre' will be more broadly defined as a facility that treats patients with specific medical conditions or patients who are in need of specific medical or surgical procedures (Schneider, Ohsfeldt et al. 2005) within only a few clinical specialty areas on an inpatient and outpatient basis. Further, the term 'treatment centre' will be used interchangeably with the other terms listed (e.g. ASC, outpatient surgery centre and specialty hospital), with 'specialty hospital' the preferred term to allude to the specialisation of this type of facility, as opposed to a 'general hospital', which provides general hospital services.

Because the expansion of treatment centres is a relatively new phenomenon, the literature that has been published to date is limited. Most of the evidence comes from

[1] For example, there is no standard definition of a specialty hospital (GAO, 2003). The US's Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA) defines specialty hospitals as hospitals that are physician owned and 'primarily or exclusively engaged in the care and treatment of patients with a cardiac or orthopaedic condition, patients receiving a surgical procedure, or any other specialized category of services designated' (MedPac, 2003). The United States General Accounting Offices (GAO) designates a facility a specialty hospital 'if two-thirds or more of inpatient claims are in one or two major diagnostic categories, or two-thirds of the inpatient claims are for surgical diagnostic-related groups' (GAO, 2003).

the United States and is from the past few years. There is, however, substantial evidence on efficiency and quality, as well as some discussion and analysis of the role of competition and ownership, from studies in the hospital sector. However, reviewing literature from the hospital sector as opposed to treatment centres presents some limitations and differences, which will be drawn out where applicable.

A range of methods was used to identify relevant published material, including:

- Searching electronic databases (King's Fund Library dataset, Medline, PubMed)
- Searching in libraries for material not generally included on electronic databases (offprint collections, published bibliographies, and ('grey literature').
- Asking experts from the academic research community, the United States Centers for Medicare and Medicaid Services (CMS), and the NHS, including Directors of Health in England, to identify relevant papers and reports.

This chapter is divided into six sections. Section 2.1 reviews the literature on efficiency. Section 2.2 reviews the literature on quality. Section 2.3 reviews the literature on ownership. Section 2.4 reviews the literature on competition. Section 2.5 provides summary remarks.

2.1 Efficiency

Efficiency is often identified with cutting costs. However, a more refined definition would encompass the way in which resources are used effectively (Le Grand, Mays et al. 1998). There are two general definitions of efficiency: technical, or internal efficiency, and allocative efficiency. A technically efficient firm produces as much output as possible with a given amount of inputs, or produces a given output with the minimum possible quantity of inputs (Vickers and Yarrow 1988; Le Grand, Mays et al. 1998; Hensher 2001). Allocative efficiency is where the 'best' mix of outputs across different services areas is selected (Vickers and Yarrow 1988). Allocative efficiency is especially important to health, and large health systems such as the NHS, where there is a monopsony purchaser of services. The evidence of technical efficiency and allocative efficiency in light of the treatment centres will be reviewed below.

2.1.1 Technical Efficiency

There are various aspects to technical efficiency including economies of scale, economies of scope, operating margins and transaction costs. Each of these components of technical efficiency will be reviewed.

Economies of Scale

Economies of scale exist if the average costs of producing a product or service decline as the volume of production increases (Vickers and Yarrow 1988). A facility that specialises in a certain procedure (i.e., hernias) should in theory maximise its productivity when it concentrates on performing a certain set of procedures. Staff skills are honed, turn-around time is minimised, equipment utilization is maximised and patient expectations can be clearly anticipated (Utley and Gallivan 2005). Economic theory would predict that mixing surgical procedure types and staffing is likely to be an inefficient way to utilise surgical facilities. A treatment centre achieves its efficiency by targeting the less complex cases, allowing other providers to take on those that are more complex.

The evidence on economies of scale in the production of hospital services on balance indicates that US general hospitals typically experience scale economies (Schneider, Ohsfeldt et al. 2005). Specific to the treatment centres, or specialty hospitals as they are referred to in the US, evidence further suggests that scale economies exist. Three important studies conducted on treatment centres in recent years all provide strong evidence that specific hospital volume and operating margins exceed those that are performed at general hospitals within the same market areas (GAO 2003; Hackbarth 2005; Leavitt 2005; Schneider, Ohsfeldt et al. 2005).

Economies of Scope

In some cases the joint production of two or more products or services can be accomplished at lower cost than the combined costs of producing each individually; these are known as economies of scope (Panzar and Willig 1981). Economies of scope can exist when production relies on common resources, such as technology, workers, inputs and general overhead. A key argument against specialty hospitals is that these facilities increase the fragmentation of care which directly leads to a loss of economies of scope and therefore loss of technical efficiency (Royal College of Physicians 2003; UNISON 2005).

However, evidence on economies of scope in the hospital industry is inconclusive (Schneider, Ohsfeldt et al. 2005). In a study on inpatient-outpatient services in US chain and non-chain hospitals, limited evidence of scope economies was found (Menke 1997). A study of 262 hospital mergers in the US between the years 1987 and 1990 found evidence of economies of scope in the merging of acute and sub-acute care and intensive care and outpatient visits. However, the merging of other services showed either diseconomies of scope or evidence which was statistically insignificant (Sinay and Campbell 1995). A study of hospitals in Washington State found no evidence of economies of scope (Li and Rosenman 2001). Overall, the literature does not provide strong evidence for the existence of economies of scope in hospitals.

Operating Margins

In the US, payment by Diagnosis Related Groups (DRGs) provides strong incentives for hospitals to specialise in those DRGs for which they have relatively low production costs (Dranove 1987). Recent studies have found that margins within treatment centres are higher than in general hospitals (Hackbarth 2005; Leavitt 2005). Where the evidence is less clear is whether the margins are higher because of the choice of procedures, or because they are able to maximise fixed costs through their focused approach.

A study conducted by the Medicare Payment Advisory Commission (MedPAC), an independent Congressional agency, analysed hospitals' Medicare cost reports and inpatient claims from 2002 (the most recent available at the time) and found that treatment centres tend to focus on surgery procedures, or DRGs, which were more profitable than medical DRGs in the same specialty (Hackbarth 2005). Inpatient margins treatment centres generated from treating Medicare beneficiaries (an average of 9.4 per cent) were slightly higher in 2001 than those reported by general hospitals (8.9 per cent). Further, the study found that within these DRGs, treatment centres had lower severity patient mixes than peer, competitor, or community hospitals. Patients with a lower severity, or case mix, are generally more profitable than the average Medicare patient, since they usually require lower costs but an identical payment is still made for the procedure (Hackbarth 2005).

Transaction Costs

Another efficiency issue concerns transaction costs. Transaction costs refer to the administrative costs of such activities as ensuring that contracts are clear, negotiated

appropriately and continuously monitored. Transaction costs can be interpreted as a technical efficiency concern (Le Grand, Mays et al. 1998),

The trade union for public service workers, UNISON, argues that high transaction costs are one of the biggest risks to the efficiency of the new NHS market (UNISON 2005). The costs of administering and managing the market must be assessed, as well as the costs of providing information, operating the pricing system, and monitoring and enforcing contracts. There may be further transaction costs in terms of regulating competition, which will be discussed in the section on competition.

There may also be transaction costs associated with market entry. During the summer of 2006, the Health Select Committee questioned the then Secretary of State Patricia Hewitt on whether ISTCs provided real Value for Money (VFM), since an average 11% premium was being paid to the ISTC providers for clinical service provision. Ms. Hewitt responded that this price was necessary to bring the new providers into the system during the first wave of tenders and that this is still much less than the 40% premium paid on spot purchasing of services from private hospitals, which is no longer necessary (Hewitt 2006). Nevertheless, the others testified to their concern that the transaction costs necessary to allow the entry of ISTCs are not warranted.

2.1.2 Allocative Efficiency

Most opponents of treatment centres will argue that, even though there may be evidence of an increase in technical efficiency, the fragmentation of health service leads to allocative inefficiency through the duplication of services, loss of economies of scope (as discussed in the previous section) and supply induced demand. An inter-related component is cream skimming, as it relates to allocative efficiency. The literature will be briefly reviewed on these aspects of allocative efficiency.

Supply Induced Demand

Theory suggests supply-induced demand in health care is possible. This occurs when adding capacity leads to more utilization on a per capita basis than if capacity had not been increased, raising costs to the health care system as a whole (Roemer 1961). This is the reason why one-half of US states have certificate of need (CON) laws to limit the expansion of medical capacity.

Schneider et. al (2005) examined whether supply induced demand existed and whether the development of treatment centres needed to be regulated. The authors found there was no evidence that specialty hospitals increased demand for services, affected access to care, or led to an increase of referrals, which could theoretically have happened because of physician-owned treatment centres and the incentive to self-refer and increase the number of procedures (Schneider, Ohsfeldt et al. 2005)

Despite the possibility of supply induced demand, England's current policy is pro-actively to increase supply and spending, while controlling costs on a per procedure basis. There is already anecdotal evidence that the introduction of additional supply to the health system via the ISTC program is driving a dramatic shift in the way private hospitals and NHS Trust Hospitals provide services (Commercial Directorate 2005; Smith 2006). With NHS waiting lists falling, and likely to continue falling, private hospitals in England will have to adapt to a competitive market where they can no longer depend on long waiting lists at NHS hospitals, even as ISTCs vie for elective surgery patients and insurance companies continue to demand lower premiums. Hospital companies such as BUPA, Capio and Nuffield cut their prices to close to NHS tariffs after the launch of the ISTC Programme (UNISON 2005) and announced plans to increasingly focus on the ISTC market (Commercial Directorate 2005).

Cream Skimming

The Treatment Centre Programme, and more specifically the ISTCs, was to improve access to care by adding capacity, offering patients choice and reducing the number of patients on waiting lists for surgical procedures (Commercial Directorate 2005; Department of Health 2005). However, opponents of the ISTCs argue that, in fact, the programme will negatively impact access and equity. There will be an impact on a hospital's financial stability because of competition, and this may force some hospitals to close, thus decreasing health care access and choice (Royal College of Physicians 2003; Hackbarth 2005; UNISON 2005). In a recent questioning of Secretary of State for Health Patricia Hewitt, MP Penning stated that 'there is no choice if you close hospitals,' in order to ensure the success of the ISTC program (Hewitt 2006). More generally, the ISTC business model is claimed to 'cherry pick,' or cream skim, healthy patients and/or profitable services, which engenders the restriction of access to certain population segments and thus lead to increased inequality within the health system. (UNISON 2005).

The danger of cream skimming was an equity issue that worried many analysts at the start of the internal market (Matsaganis and Glennerster 1994; Le Grand, Mays et al. 1998), though evidence of this was never found (Le Grand 1999). Nevertheless, this same concern has been voiced against the ISTCs (Royal College of Physicians 2003; British Medical Association 2005; UNISON 2005). 'Cream Skimming' is the idea that ISTCs will 'cherry pick' healthy patients and/or profitable services, thus restricting access and increasing inequality within the health system. (Carvel and Tomlinson 2005; UNISON 2005). Le Grand defines cream skimming as the deliberate selection by providers of patients who are easier or less costly to treat (Le Grand, Mays et al. 1998). The OECD similarly defines cream skimming as when a provider tries to select the most favourable individuals with expected costs below revenues in order to increase profits (OECD 2005). Getzen (1997) defines cream skimming as either providing only the most profitable services or only providing services to the healthiest patients. Further, the method of reimbursement influences both the intensity of services and who is treated when patients differ in severity of illness. Prospectively paid providers more often select low severity patients and skimp on high severity ones. There is also the potential for dumping of high severity patients, which occurs when providers reject cases they deem to be unprofitable (Ellis 1998; Department of Health 2006).

In the US, a central argument for controlling the development of treatment centres is that they select only the most profitable patients and leave the unfunded, and/or high cost patients to general hospitals (Shactman 2005). There are four studies that have assessed this issue with respect to patients in treatment centres vis-à-vis general hospitals. The MedPAC study found that specialty hospitals did indeed tend to focus on procedures that were more profitable and had lower severity patient mixes than peer, competitor, or community hospitals (Hackbarth 2005). The GAO found that 'patients at specialty hospitals tended to be less sick than patients with the same diagnoses at general hospitals' (GAO 2003). A study by Cram et al. (2005) evaluating quality in treatment centres also found that patient severity for cardiac surgery patients was lower than in general hospitals (Cram, Rosenthal et al. 2005). Only the MedCath study found treatment centres admitted sicker patients than those admitted to competing general hospitals (Dobson 2004).

There has been anecdotal evidence that ISTCs engage in cream skimming by referring complex patients to NHS Trust Hospitals. However, from the perspective of

specialisation, an organization should match its capabilities to the goods it produces. This is in line with the conclusions of the Browne et al. (2008) research study. If a facility is tailor-made to perform minor surgery, it makes no sense for it to perform major operations. Therefore, from an economic standpoint, cream skimming may in fact be efficient. Evidence supporting the positive effects of cream skimming include a case study of the Shouldice Hospital (Herzlinger 1997; Chilingerian 2004; Urquhart and O'Dell 2004), where the facility focused solely on hernia repair.

The evidence supports the claim that, though treatment centres in the US target low complexity patients, there has been little, or no, negative financial impact on general hospitals, at least none that would potentially limit access to care. It is too early to tell whether there has been an impact on access to care following the introduction of the ISTCs in England. There is data that shows waiting lists have decreased within certain specialties and in certain regions. However, the overall effect for the entire health system is not yet clear.

2.1.3 Efficiency Summary

In theory, a facility that specialises in a certain procedure should maximise its productivity when it concentrates on performing the procedures. Staff skills are honed, turn-around time is minimised, equipment utilization is maximised and patient expectations can be clearly anticipated. One of the most inefficient ways to utilise surgical facilities is to mix surgical procedure types and staff. A treatment centre achieves its efficiency by targeting less complex cases, leaving the rest to other providers.

Economic advantages appear to be associated with specialisation, mainly from process redesign, increased learning, and an emphasis on core competencies. A treatment centre achieves its efficiency by targeting cases either by complexity and/or procedure. The treatment centre approach may improve efficiencies at a systemic level, since the approach allows other providers to take on the more complex cases or other types of procedures. Thus, society may be better off if both organizations become more focused and achieve operational effectiveness for a given patient population with the treatment centres taking on less complex cases, and the general hospitals taking on more complex cases.

Some have argued that increasing a system's capacity can actually raise costs, and decrease allocative efficiency, because of supply induced demand. The US has

widespread Certificate of Need (CONs) regulations in place to limit the development of medical facilities and there was an 18-month moratorium on physician-owned specialty hospitals so that Congress could further assess these negative impacts. However, CONs have begun to fall out of favour in recent years and Congress let the 18-month moratorium expire following the MedPac, CMS and GAO studies.

2.2 Quality

There are many different definitions of quality. Quality may be defined and measured in terms of health outcomes indicators such as mortality. It could refer to patient satisfaction from the services provided. It may refer to the outputs and productivity of the overall health system, such as hospital discharges and waiting lists. Or it may refer to the inputs within a health system such as physicians, physician to bed ratio, nurses, facilities and equipment (e.g. beds and operating ro) (Le Grand, Mays et al. 1998). Further, it must be decided if quality is to be measured at the level of the individual practioner's performance, or at the level of the entire health system (Donabedian 1988).

Here, we define quality in terms of outcome. A general literature review is undertaken to examine the evidence for a correlation between volume and quality as measured by outcome indicators. The research on the quality outcomes of the US specialty hospitals is also discussed. There is some initial recent evidence on quality from the ISTCs because of Key Performance Indicator (KPI) reporting. These studies will be assessed in the following sections.

2.2.1 Quality Outcomes: The Volume and Quality Correlation

Outcomes are the improvements to an individual's health directly attributable to the relevant policy intervention (Le Grand, Mays et al. 1998). Extensive research has been undertaken to uncover a link between quality and volume (Hannan, O'Donnell et al. 1989; Hannan, Racz et al. 1997; Birkmeyer, Siewers et al. 2002; M. Porter and E. Teisberg 2004; Enthoven 2005). The terms quality and outcomes will be used interchangeably in this chapter.

The most extensive research on the correlation between volume and quality was conducted in the United States. Luft et al. (1979) studied mortality rates for 12 surgical procedures of varying complexity in 1,498 hospitals to determine whether there was a relationship between a hospital's surgical volume and its surgical

mortality. Luft found that the mortality of certain procedures (i.e., open-heart surgery, vascular surgery, transurethral resection of the prostate and coronary bypass) decreased as the number of operations increased. For certain other procedures however, the mortality curve flattened at lower volumes. For example, Luft found that hospitals doing 50 to 100 total hip replacements attained a mortality rate almost as low as that of hospitals doing 200 or more. Luft also found there were some procedures, such as cholecystectomy, where there was no relation between volume and mortality. Luft concluded that in general there was a direct relationship between volume and quality. Some have since argued that the procedures for which there was no correlation between volume and mortality may be because of other factors, such as physician experience, referrals to institutions with better outcomes, as well as patient selection (Luft, Bunker et al. 1979).

Dudley et al. (2000) provide further evidence that high-volume hospitals (HVHs) have lower mortality rates than low-volume hospitals (LVHs) for certain procedures. Their research sought to quantify how many deaths could potentially be avoided in California by referral to HVHs. The authors found statistically significant results supporting a volume-outcome relationship. Mortality was significantly lower at HVHs for more than a dozen procedures and the authors estimated that 602 deaths at LVHs could be attributed to their low volume (Dudley, Johansen et al. 2000).

Shortell and Hughes (1988) studied inpatient Medicare discharges for 16 selected clinical conditions and examined the effects of the regulation of hospital rates, state certificate-of-need programs, competition, and hospital ownership, on mortality rates. The authors found no statistically significant association between mortality rates among inpatients and the type of hospital ownership or the number of hospitals competing in the market area. However, the authors did find statistically significant associations between higher mortality rates and the higher level of strictness in the level of regulation of hospitals (CON) in a state. The findings cast doubt on the effectiveness of high levels of regulation on hospital quality, when compared to hospitals in relatively competitive markets (Shortell and Hughes 1988).

Birkmeyer et al. (2002) provides further evidence that higher volume is associated with better quality and leads to lower per-case costs. The authors used information from the national Medicare claims data base and the Nationwide Inpatient Sample to examine the mortality associated with six different types of cardiovascular procedures and eight types of major cancer resections between 1994 and 1999 (total number of

procedures, 2.5 million). The authors found that mortality decreased as volume increased for all 14 types of procedures studied. However, like the Luft study, the importance of volume varied significantly according to the type of procedure. The authors concluded that there was a statistically significant volume-mortality relationship for Medicare patients undergoing certain procedures (i.e., cardiovascular and cancer). However, without being able to evaluate quality at the level of the physician or other comparison hospitals in close proximity to the hospitals studied, the study's findings are limited (Birkmeyer, Siewers et al. 2002).

Though evidence appears to suggest there is a clear volume-quality relationship, Enthoven and Tollen feel the importance of volume sensitivity to quality is overstated. Their review of the literature found statistically significant results supporting a volume-outcome relationship in only 36 conditions/procedures out of more than 500 DRGs (Enthoven 2005).

Welke, et al. (2005) conducted a retrospective cohort study of Medicare patients undergoing a coronary artery bypass graft (CABG) in US hospitals from 1996 to 2001 and assessed the relationship between hospital volume and CABG mortality. The authors found volume alone was a poor discriminator of mortality and 'only slightly better than a coin flip' (Welke, Barnett et al. 2005).

Opponents of treatment centres argue that these facilities cannot secure a high enough volume to improve quality and reduce costs without taking patients away from the local hospitals. It has been argued that when more hospitals compete for an identical or lower volume of services, quality may actually decline because each hospital individually has less volume (Royal College of Physicians 2003; Enthoven 2005; UNISON 2005). If this is the case, promoting a policy of specialisation and thereby further fragmenting a health system, may in fact create poorer quality outcomes (UNISON 2005) than if no such policy had been adopted.

The evidence does indicate there is a statistically significant relationship between volume and quality, using mortality as an outcomes measurement. However, the volume-quality relationship is not uniform and the level of volume needed to provide evidence that is statistically significant is dependent on the type of procedure. Threats to the validity of the studies may also be present, as outcomes may be dependent on the experience and quality of the specific physician, as well as the hospital.

2.2.2 Quality Outcomes: Evidence from US Specialty Hospitals

The empirical evidence on the quality of care provided by the US specialty hospitals is limited to just a few studies, one by the Lewin Group (Dobson 2004) and another by Cram et al. from the University of Iowa (Cram, Rosenthal et al. 2005). The US Department of Health and Human Services (HHS) studied the impact of treatment centres on access and quality in the health system but from a qualitative standpoint.

The Lewin Group examined how cardiac care services provided in MedCath heart hospitals, the only publicly-traded specialist hospital focused on cardiac surgery in the United States, compared peer hospitals across the country on measures of patient severity, quality and community impact. The Lewin Group found that MedCath hospitals had a higher case mix severity (20.6%), 16% lower mortality rates, and shorter average length of stay (ALOS) when adjusted for case mix index (CMI) (Dobson 2004). Still, the conclusions are not universally endorsed. For example, the authors used national average data, but comparing MedCath hospitals with competitor hospitals (a 20 mile radius as defined by the Center for Medicare and Medicaid Services (CMS)) may have been more relevant (Leavitt 2005). Furthermore, MedCath's unwillingness to share the full publication of its research has raised additional questions on the research design and methodology used.

A study by Cram et al. (2005) attempted to evaluate whether quality is in fact better in US specialty hospitals because of their focused approach. The authors conducted a retrospective cohort study of 42,737 Medicare beneficiaries who underwent either an angioplasty (42,737 cases) or coronary bypass surgery (26,274 cases) in 2000 and 2001 in specialty cardiac hospitals and general hospitals in the same markets. One of the important strengths of the study was the investigation's focus on patients who received treatment in one of 15 cardiac treatment centres or 80 general hospitals in the same markets. The Cram study found that quality was better within the specialty hospitals, but also that these facilities admitted healthier patients. Adjusting for case mix, the authors found overall quality improvement was statistically insignificant (Cram, Rosenthal et al. 2005). However, researchers did find that volume levels were higher in specialty hospitals, even as the level of quality was equal to, or no worse, than outcomes in the competitor general hospitals.

Finally, the Schneider et. al (2005). study appears to support the Cram (2005) findings. Schneider studied 10 specialty hospitals and compared them to competitor

hospitals. The empirical findings suggested the intensity and quality of services are likely to be higher in specialty hospitals (Schneider, Ohsfeldt et al. 2005).

The US Department of Health and Human Services (HHS) studied the impact of treatment centres on access and quality in the health system. It found treatment centres had an overall positive impact on US health care, that patient satisfaction was high, and quality of care was as good, or better, than at competitor hospitals. The HHS study did find that treatment centres provided a smaller share of uncompensated care vis-à-vis competitor hospitals. However, since treatment centres paid real estate and property taxes, as well as income and sales taxes, whereas not-for-profit community hospitals did not, it can be argued the total proportion of net revenue that treatment centres devoted to uncompensated care, combined with taxes, exceeded the proportion of net revenues that community hospitals devoted to uncompensated care (Leavitt 2005).

2.2.3 Quality Outcomes: Evidence from the ISTCs

Some initial evidence on quality outcomes from the ISTCs can be drawn from the Key Performance Indicator (KPI) reporting. The KPIs are reported monthly to the Central Contract Management Units (CCMU) and cover 26 performance measures for the NHS to track. The National Centre for Health Outcomes Development (NCHOD), using KPI indicator reporting, published a report of five providers that have commenced operations under the ISTC programme. The schemes included had been in operation for over six months prior to June 2005. NCHOD were quite positive (National Centre for Health Outcomes Development 2005), noting:

- There is a robust quality assurance system in place, more ambitious and demanding than that for NHS organisations. The KPI data to be collected and provided by the ISTCs extends beyond that used by the NHS.
- Early results of quality monitoring are encouraging.

However, of the 26 KPIs, only six encompass clinical data, as the KPIs themselves are about improving processes rather than specific outputs or, in this case, outcomes (2006).

Less encouragingly, five Leeds musculoskeletal radiologists have been involved in reporting orthopaedic x-ray exams undertaken on patients who were treated at the Nuffield Hospital, which was part of the ISTC Wave 1 contracts. The physicians reviewed 70 hip replacements, as well as both the pre- and post-operative appearances

of the x-ray images. The physicians found that in 47 (67%) of the cases the x-ray images led the researchers to have serious concerns about the surgical practice of the individuals undertaking these procedures. The findings suggest a wide range of problems which include: selection of prosthesis size and type, adequacy of cement mantles and acetabular cup and femoral component positioning. In one case there were only minor changes from the pre-operative images and the researchers questioned whether a hip replacement was necessary at all, from a radiographic view point (O'Connor and Grainger 2005). Furthermore, a Bristol Audit found that the Cheltenham Nuffield Hospital re-operation rates for hip and knee replacement surgeries were 10 times higher than that of the Bristol and Weston Hospitals (Bannister 2006). As a result of the ISTCs, the NHS was 'left to pick up the pieces' (Wallace 2006).

There is there may be some potential linkages between a reduced average length of stay followed by an increased readmission rate thus presenting poorer outcomes and even a potential increased cost to the health system. The literature was reviewed in this respect.

There is some evidence which indicates that patients that are readmitted have a longer length of stay from their initial admission and that providers with lower than average lengths of stay for first admission have higher readmission rates (Dobrzanska and Newell 2006; Hamilton and Bramley-Harker 1999). The Dobrzanska and Newell research aimed to identify the reasons that may have contributed to the emergency readmission of older people to a medical unit, within 28 days of hospital discharge. The authors conducted a year-long study which examined reasons for unplanned readmission of patients (aged 77 and over) within 28 days of hospital discharge. The population was patients, registered with North Bradford PCT General Practitioners, readmitted to one of five care of older people wards in two local acute trust NHS hospitals. The research suggested that a shorter length of stay was associated with increased likelihood of earlier readmission. However, a key limitation of this study in terms of relevant to the TC programme is that there are high risk patients whereas the TC target lower or patients were risks for readmission should be contained.

Hamilton and Bramley-Harker (1999) studied the internal market NHS reforms introduced in 1991 to provide incentives for efficiency and cost effectiveness, specifically to reduce waiting times and to improve postsurgical outcomes. The

authors found that waiting times for hip fracture surgery declined after the NHS reforms but that patients were more likely to be discharged to another provider.

However, there is also evidence of the reverse (Clarke and Rosen 2001; Downing, Scott et al. 2008; Epstein, Bogen et. al 1991; Harrison, Graff et. al 1996; Louis, Yuen at al. 1999). For example, Clarke and Rosen (2001) conducted a review of the research literature on reducing average length of stay and the impact upon health care quality outcomes. They found no adverse effects on health outcomes from the reduction of ALOS.

Clarke and Rosendo point out that there may nevertheless ethical or moral reasons for a minimum ALOS. Further, a reduction in ALOS may in fact cause increased expenditure as a result of an increase in the number of high intensity days of hospital care at the expense of less costly and lower intensity days at the end of a hospital stay. And lastly, lower ALOS within a hospital may result in cost shifting on to community carers, relatives and friends.

In the Epstein (1991) study, the authors examined lengths of stay and readmission rates for all Medicare patients discharged from Massachusetts acute care hospitals between October 1982 through September 1986. The period coincided with the implementation of the prospective payment system in the United States. The authors found that over the four years of the study, ALOS decreased by 25% overall and by 12% to 38% for the individual conditions studied (all p less than .05). The authors did find that readmission rates increased by approximately 10% (p less than .05) during this period; but the increase was not statistically associated with the method of prospective payment and the reduced ALOS.

In Canada, a similar study was conducted (Harrison, Graff et. al 1996). The authors attempted to determine whether decreasing lengths of stay over time for selected diagnostic categories were associated with increased hospital readmission rates. The study included seven large (125 beds or more) acute care hospitals in Winnipeg, Manitoba. The patients included those who were admitted to any one of the seven hospitals because acute myocardial infarction (AMI), bronchitis or asthma, transurethral prostatectomy (TURP) and uterine or adrenal procedures for non-malignant disease during the fiscal years 1989-90 to 1992-93. The ALOS decreased significantly over the four years for all of the four categories with the smallest change being observed for patients with AMI (11.1%) and the largest for those with bronchitis or asthma (22.0%). Overall, the authors found that there was no significant

correlation between length of stay and readmission rates for individual hospitals in 1992-93 in any of the four categories. As a result, the authors concluded that improving hospital efficiency by reducing ALOS did not appear to result in increased rates of readmission within 30 days after hospital discharge.

The Louis (1995) research examined the implementation of the DRG system in Italy and how it would affect hospital productivity and outcomes. The research found that there was a decrease in ordinary hospital admissions, an increase in day hospital admissions, and a greater severity of illness among hospitalized patients, suggesting better use of existing resources and improved productivity, with little or no change in mortality and readmission rates.

Specific to the UK, Downing et al (2008) researched the number of acute medical admissions to the Queen Elizabeth Hospital, Gateshead unit, a short-stay unit (SSU) which was developed specifically for such patients. The authors found that, through the use of the SSU, the mean length of stay was 33 hours and the overall length of stay across the entire hospital was significantly lower (4.6 days) than the corresponding period a year earlier (5.5 days) ($p = 0.02$), with readmission rates not being affected. This suggested that the introduction of an SSU can help identify and treat those patients with more minor illness who can often be discharged home at an earlier stage, much like the goal of the TCs.

In summary, the review of the potential relationship between lower ALOS and increased readmissions (or more general poorer outcomes data) suggests that there is little effect. However, this cannot be completely conclusive as there may be significant externalities, with the possibility of extra costs being imposed on support systems outside the hospital. Clearly the evidence would be strengthened if there was research specific to the TC Programme or other procedure areas that are of an elective nature.

2.2.4 Quality Summary

In general, research indicates higher volume is associated with better quality and lower per-case costs. Drawing on the theory of specialisation, proponents argue that specialty hospitals can secure high volumes, thereby improving quality and reducing costs. Opponents argue that specialty hospitals cannot secure a high enough volume to improve quality and reduce costs without taking patients away from community hospitals. When more hospitals compete for the same or lower volume of services,

quality may decline and thus per-case costs may increase because each hospital has less volume.

In sum, the principal results for quality fail to decisively prove that specialisation improves quality in terms of outcomes. On balance however, the evidence does support the assertion that specialty hospitals provide no worse quality in terms of outcomes and mortality indicators, as opponents of these types of facilities have contended.

2.3 Ownership

The belief as to whether public services can and should be delivered by the private sector is often distinguished by political affiliation. However, the research surrounding economic theory has tended to ignore the issues of ownership (Preker and Harding 2002) and the rationale for the ownership status affecting a firm's behaviour and performance (Vickers and Yarrow 1988).

This sub-section will lay out the general theory on ownership and discuss the evidence of ownership specific to health care. However, there are a number of other reasons for assessing the evidence, beyond the obvious and important point that ownership may be an important factor in determining differences in efficiency and quality levels within the health care facilities. As policy makers in the health sector increasingly struggle to increase access, improve quality and control costs, the role of the private sector ownership in public health service provision is becoming increasingly seen as an important mechanism to attain these health policy goals and objectives.

2.3.1 General Theory on Ownership

Already over two centuries ago Adam Smith pointed out that there was a positive connection between ownership and performance. Adam Smith (1776) noted:

> The directors of...companies,...being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own. Negligence and profusion, therefore, must always prevail,...in the management of the affairs of such a company.

John Vickers and George Yarrow (1988) present the most comprehensive and rigorous analysis of privatization - both in general and in the UK - that has appeared to date. Vickers and Yarrow argue that ownership of a firm will have significant effects on its behavior and performance, since changes in property rights will alter the structure of incentives faced by decision makers in the firm (Vickers and Yarrow 1988).

Vickers and Yarrow conclude that the allocation of property rights does matter because it determines the objectives of the 'owners' of the firm (public or private) and the systems of monitoring managerial performance. Public and private ownership differ in both respects. As a result, changes in property rights will materially affect the incentive structures, and hence the behavior of management (Vickers and Yarrow 1988).

One widespread perception is that privately owned companies are profit maximisers for their shareholders, or owners, and maximising shareholder benefits is not always seen as maximising benefits to society as a whole. Therefore, the rationale for public ownership has been in large part used for pursuing social objectives when the market fails (Preker and Harding 2002). To put it another way, though there may be internal efficiency benefits within firms under private ownership, these benefits are seen to be outweighed by the loss of allocative efficiency and the resulting costs to society as a whole (Vickers and Yarrow 1988).

This divergence between shareholders' and society's interests, and internal and allocative efficiency, may exist for a number of reasons. First, competitive solutions may not exist because of a natural monopoly. Second, competitive solutions may in fact exist; however, these solutions are not efficient in an allocative sense due to externalities on public goods. A third reason may be asymmetry of information, where information to one party in a transaction has more or better information than the other party. Addressing these market failures and thus maintaining the wider interests of the public provides the justification for supporting public ownership in the health sector (Preker and Harding 2002).

The traditional assumption that the objectives of the government policymakers and the managers of public organizations were identical has been an underlying rationale for public sector ownership. The assumption was that public ownership removed the opportunistic 'profit maximiser,' and with the financial motivations removed, the public sector managers would be able to pursue the public interest.

The original welfare state of Great Britain was designed based on this assumption. Those who worked within the welfare state were knights. Doctors, nurses, teachers, social workers, etc. were viewed as being motivated primarily by their professional ethic and hence concerned only with the interests of the people they were serving (Le Grand 2003).

However, in reality politicians, civil servants and professionals have not always turned out to be the 'high custodian of public interest (OECD 1992).' Clearly, there are other potential motivations to these individuals than purely the interests of the people they serve.

Le Grand concludes (2003):

> We cannot rely on the public service ethos - pure knightly motivations - to deliver public services in the quantity and quality that we require. But rewards for public service should not be such that all elements of sacrifice are removed - otherwise there is a danger that all public services will only be provided by knaves.
>
> In fact, it is not necessary to turn knights into knaves for pawns to become queens. What we need are well-designed public policies, ones that employ competitive mechanisms but that do not allow unfettered self-interest to dominate altruistic motivations. Knavish and knightly incentive structures should not work against one another but instead should be aligned.

Beyond Le Grand's investigation into motivation of individuals, there has been a significant amount of research of late to identify the key factors that cause these wide variations in organisational performance. Specific to health care, there are a number of 'streams of thought' that have dealt with the public-private firm comparison: Agency Theory; Property Rights Theory; Public Interest; and Organization Theories (Vickers and Yarrow 1988; Villalonga 2000; Preker and Harding 2002). Here we categorise the research into two main streams of thought: Principal–Agent Theory and Motivation.

Principal - Agent Theory

Principal–Agent Theory, or Agency Theory, is based on the different agency relationships that are associated when an agent is authorised to act on behalf of the principal. Agency refers to the capacity of individual humans to act independently and

to make their own free choices (Parker 1995; Villalonga 2000). However, difficulties arise under conditions of incomplete and asymmetric information. This is especially prevalent in health.

The agency problem is best illustrated when an owner (principal) and manager (agent) of a firm do not share the same objectives. The principal wants the agent to act in his (the principal's) interests. However, the principal does not have full information about the agent. The principal-agent theory is focused on this problem of information and incentives (Preker and Harding 2002).

There are a number of varying principal-agent relationships in society including: employers and workers; lenders and borrows; and regulators and managers. In health, the most pointed to relationship is between the physician and patient. The physician wants the patient to act accordingly to his or her advice. Issues arise if the physician is financially incentivised to perform certain procedures (e.g. highly profitable) or refer to a certain facility (e.g. where there is a financial stake involved) regardless of the quality or cost to the patient.

Another relationship often pointed to is between the physician and hospital manager. Physicians and hospital managers have divergent interests, yet there is a high level of interdependence (Preker and Harding 2002). This creates an environment of natural tension between practicing physicians and the hospital managers. This tension arises between the physician's primary role in providing the best quality of care to the patient, irrespective of cost and an administrator's primary role in managing costs (Crilly and Le Grand 2004).

There is also tension in a publicly run health care system, such as the NHS between the central government and provider units. In England, the NHS Trust Hospitals are under stress at the end of every fiscal year to meet targets mandated by the central government such as wait list targets.

Clearly, it is this principal-agent relationship which could be a main driving factor between efficiency and quality outcomes data that differentiate the publicly and privately owned facilities. Managers (the agent) in both public and private firms (e.g. treatment centres) are assumed to seek the maximization of their own utility rather than that of the organization or its owners (the principal). However, Vickers and Yarrow (1988) argue that problems with the principal-agent relationship, with differing objectives, is less prevalent within private firms. First, there is a market for a firm's ownership rights enabling owners to sell if they are not satisfied with

managerial performance. This is the focus of Property Rights Theory and discussed in the following paragraphs. Second, there is the threat of takeover. Underperforming firms may be acquired if other companies find that they can improve profitability within the respective firm through the use of existing, or less, resources. Third, there is the threat of bankruptcy incentivise private sector managers and owners. And fourth, there is a labour market for managers. Vickers and Yarrow (1988) argue that these mechanisms are absent, or at a minimum, less prevalent within public firms.

Motivation

There are a number of various streams of thought on motivation and appropriate incentive structures. These include property rights theory, public-interest theory and organisational theory. These will be further discussed below.

The underlying premise in property rights theory is that changes in property rights alter the structure of incentives faced by decision makers in a firm. These changes can be through the possession of residual decision rights or the allocation of residual returns. Residual rights of control are defined as the rights to decision-making over the use of an asset. Typically, an asset owner usually holds these rights. However, the owner or the law may allocate many rights to others, such as the granting of concession rights of a hospital to the private sector. A driver for this transfer of rights of control to the private sector is that governments relieve themselves of the responsibility for funding hospital deficits and continuous capital expenditure commitments (Preker and Harding 2002).

The idea of ownership as residual control is relatively clear for a simple asset such as an automobile. However, when a number of assets are bundled together, which frequently lead to unclear decision rights, residual control becomes more complex (Preker and Harding 2002). An example is a tertiary care hospital, with responsibilities for medical care provisioning as well as teaching and research responsibilities. Typically, the hospital is owned by the state, but the academic physicians and researchers will be employees of the university, which could also be state owned.

The over-riding assumption to this point has been that the sole aim of privately owned firms is profit maximization[2]. However, in reality there are a number of

[2] Profit maximization here is assumed to encompass both current and future financial flows.

constraints put on the pursuit of profit maximization: firm's shareholders; other investors or their agents; and the firm's creditors (Vickers and Yarrow 1988).

As a result, there are a number of problems with the assumption that a firm's shareholders will seek to maximise their expected financial return from the company. This assumption ignores the time-frame for the return on investment. Shareholders have different expected time-frames for their respective return on investment. In the health sector, returns to investment may take longer than other industries typically due to the nature of large capital expenses. A pension fund might prefer a higher dividend payout ratio than an individual investor faced with somewhat a different tax position. Moreover, the expected pay-out may be different within the various shareholders (Vickers and Yarrow 1988).

There is also the threat of takeover by other investors. This affects not only the shareholders but also management. If the management of a firm does not perform in line with the expectations of the market, the share price of the company may fall. As a result, the cost of purchasing shares will decline. The existence of this threat of takeover acts as an incentive mechanism and control on management and should deter management from pursuing policies which may hurt the company's share value. Therefore, interests of shareholders and management may in reality be quite closely aligned (Vickers and Yarrow 1988).

The threat of bankruptcy constraints can be viewed as another constraint put on the pursuit of profit maximization. In the event of default, owners may lose control of the company and the firm's creditors could seek managerial changes. Therefore, bankruptcy can be regarded quite closely to the takeover constraint described above (Vickers and Yarrow 1988).

From the discussion, it can be expected that the transfer of ownership will be associated with some change in the types of incentives within a firm. Under private ownership, employers and even employees can receive financial remuneration linked to the company's share price or options schemes. At the same time, profit maximization may in reality have a number of constraints put upon the owners and managers of a firm such as differing expectations of a return on investment by various shareholders, the threat of a takeover by another firm and bankruptcy leading to a loss of employment. Therefore, these constraints may in fact provide a significant amount of discipline, tempering the profit maximization that is assumed within the private sector.

Public interest theory is based upon the assumption that government seeks to maximise the economic welfare of society. However, Vickers and Yarrow (1988) cite four potential drivers where the public good is not maximised within publicly owned industries: displacement of social objectives by political objectives; a preference for direct political intervention in managerial decisions over an 'arm's length' relationship that would restrict government departments to the task of setting appropriate managerial incentive structures; internal inefficiencies in bureaucracies and inefficient levels of bureaucratic activity.

As a result, public choice theory has arisen. Public choice theory studies the behaviour of voters, politicians, and government officials with the notion that all are primarily self-interested agents (Zeckhauser and Horn 1989; Haskel and Szymanski 1992; Boycko and Vishny 1996). Public choice theorists see bureaucrats as self-interested utility-maximisers, motivated by such factors as: salary, prerequisites of the office, power and public status (Niskanen 1973).

Organisational theory is based upon the study of individual and group dynamics in organisations. Organisational theory draws heavily from public choice theory and public interest theory (Villalonga 2000). It is argued that organisational characteristics of private firms are different for those of state-owned firms. These characteristics are different with respect to incentives and control mechanisms (Ricart, Gual et al. 1991), culture (Bishop and Thompson 1992), objectives, organisational structure, communications and reporting systems, management, labour and type of business (Parker 1993; Parker 1995; Martin and Parker 1997).

In general, incentive mechanisms are a result of financial remuneration, as well as the control mechanisms in place. With respect to England's National Health Service, the NHS consultants have recently received a 25% increase in their pay between 2004-2007 while seeing their workload fall (National Audit Office 2007). However, new market entrants will likely have affects on future negotiations with the NHS consultants. The incentive mechanisms in place within the NHS TCs will be assessed vis-à-vis the ISTCs.

A fundamental aspect of organisation theory is that the goals and activities of a firm are determined by the organisation's structure. The NHS is one of the world's largest employers, with a central command structure, directed by policy-makers from London. As will be discussed, the current emphasis on reducing waiting times from London has resulted in the current operational priorities within the NHS facilities.

Ownership Summary

Theory predicts the ownership status of a firm has significant effects on a firm's behaviour and performance. The effect of a change in ownership is driven by a change in the objectives of the owners of the firm (public or private) and the incentive arrangements in place for management. The major streams of thought have dealt with the differences between public and private firms. Each stream considers aspects of information, motivation, innovation, and the implications for how productive activity can best be organised. However, none of these theories fully capture how ownership impacts a firm's behaviour and performance. It is possible to argue that the privatization of a firm that enjoys substantial market power will tend to improve internal efficiency. However, the increase in market power tends to heighten the risk of worsening allocative efficiency unless profit-seeking behaviour is appropriately regulated and competitive regulations are put into place.

The privatization program during the Thatcher-era was partly motivated by dissatisfaction with the economic performance of publicly owned firms. The firms providing electricity, gas, telecoms and water were all monopolies. However, there was little evidence from which to benchmark performance and so, most empirical research on the UK privatization program has focused upon more competitive market structures where the two types of ownership have coexisted (Vickers and Yarrow 1988). The evidence does suggest that where competition is effective, and market failures are absent, private enterprise is generally to be preferred on both internal and allocative efficiency grounds (Vickers and Yarrow 1988; Vining and Boardman 1992).

However, the health sector is different from other public services. The NHS is a large organization with the purchasing and provisioning functions taken at various levels. Purchasing could be undertaken by the General Practioners (GPs), Primary Care Trusts (PCTs) and even at the national level of the NHS. Provisioning is relatively fragmented as well, depending on the type and complexity of clinical service need. Therefore, there is the potential to assess the evidence and provide comparative benchmarks between the local Trust Hospitals. We will now review the evidence specific to the health care sector.

2.3.2 Ownership in Health Care

A key aspect that may differentiate the health sector from other sectors is the various organisational structures involved which may affect behaviour and in turn impact performance. There are also a number of ways of classifying hospitals, the main provider of health care services. For example, the OECD classifies hospitals as: public, private not-for-profit (NFP), and private for-profit (FP). Busse (2002) uses a classification which incorporates not only ownership structure and the autonomy of hospital management, but also how the hospital is paid (e.g., it defines budgetary organizations as being paid on a line-by-line budget). Preker and Harding (2002) focus on five elements of a hospital's organisational structure: the extent to which hospitals can make decisions about their activities; the degree to which hospitals can keep any surpluses; the extent of reliance on market incentives; the nature of accountability; and the approaches taken to protect social functions which might not be financially viable. Other elements which may be incorporated into typologies include statutory responsibility, and the existence of defined contracts (Deber, Topp et al. 2004).

Relevant to the English is the typology of organisational arrangements put forth by Harding and Preker (2003). These typologies include: administrative unit, autonomous unit, corporatised unit and private. The administrative unit is where most budgetary and input decisions for the hospital are made, under the hierarchical control of government authorities. In effect, the facility is directly managed by its government owners (Harding and Preker 2003). This form was commonplace for most NHS Trust Hospitals until the 1991-1997 Internal Market reforms (Le Grand, Mays et al. 1998).

Facility managers within autonomous units have much greater decision-making authority. Key decision-making inputs could be in the selling of services, charging fees and budget management. However, facilities that remain under public ownership are typically subject to public sector rules for procurement, labour usage and contracting (Harding and Preker 2003). Following the implementation of the NHS internal market reforms, NHS Hospitals became established as semi-autonomous trusts (Le Grand, Mays et al. 1998; Enthoven 2000) and were allowed greater flexibility in their spending and staffing level decisions.

Managers in corporatised units have full, or nearly full, decision rights over input, service mix, financing and spending. They are accountable in terms of financial and

service performance, but are generally free from public sector rules that would restrict them in areas such as procurement, labour and contracting. Corporatised facilities, however, are still under public ownership and must comply with the commitment of providing care to public patients (Legnini, Anthony et al. 1999; Harding and Preker 2003). The current transition to Foundation Trust (FT) Status for a number of NHS Trust Hospitals is relevant here, as these hospitals could be deemed corporatised units.

FTs are theoretically free from interference by the Department of Health (DH), which means they can set their own priorities for service delivery on the basis of need, not national targets. They are free to provide private health services, to borrow money on private financial markets, to buy and sell land and buildings, and, most importantly, to keep the proceeds for their own ends (Seddon 2007).

The private form of ownership can consist of not-for-profit (NFP) and for-profit (FP) entities. These entities are fully responsible for financial and operational performance. In theory, incentives are aligned to earn revenues, monitor and maintain performance, and expand or at least retain market share (Harding and Preker 2003). Depending on the country, NFP hospitals can play an important role in the provisioning of care.

The vast majority of the literature specific to ownership stems from the United States due to the strong emphasis of private provisioning (NFP and FP). However, most of literature pertinent to the discussion on ownership is assessed in conjunction with competition and/or level of regulation in the market.

There has been a general trend in the US of converting to private NFP and FP status. The number of public hospitals has been decreasing since at least the mid-1980s (Legnini, Anthony et al. 1999). In the past 25 years, 330 of the nation's 5,000 hospitals converted to FP status alone. There are a number of reasons for this, including the belief that an FP status will improve efficiency, will allow for additional cost cutting, and increase access to capital (Cutler and Horwitz 1998).

In another publication by Horwitz (2005), the author examined a hospital's objectives, capital prices and market characteristics vis-à-vis ownership type. Horwitz found that hospital behaviour is most dependent on the ownership form of their competitors in the same market.

Most often the literature specific to ownership in health care has been assessed within the context of competition. Woolhandler and Himmelstein (2004) have found that private hospital care is relatively expensive in markets that are more competitive.

Shortell and Hughes (1988) found no statistically significant relationship between inpatient mortality rates and either the type of hospital ownership or the number of hospitals competing in the market area. Gaynor and Vogt (2003) examined competition in the US hospital industry, in particular the effect of ownership type on the hospital industry in California. They found both that there is competition and that ownership matters. Further, NFP hospitals exploit market power in the same capacity as FP hospitals. Their research is more fully discussed in the section relating to competition.

Regulation of services also plays an important role in the health market. Health care authorities in a number of countries regulate the clinical services and the number of beds within a certain area. In the US, for example, 70 per cent of the states use Certificate of Need (CON) to regulate the development of health care services in some capacity (AASC 2006). There has also been substantial evidence pertaining to the correlation between performance and the level of regulation in a state (Shortell and Hughes 1988). CONs have not succeeded in cost containment – indeed, the bulk of the literature indicates that CONs increase costs. A fundamental problem with CONs is that they award a property right, often in perpetuity, thus giving in effect a monopoly franchise (Ohsfeldt and Schneider 2006).

In Englad, the level of regulation has been relatively high and competition relatively restricted, with respect to NHS patients. However, following the recent introduction of ISTCs, there has been substantial anecdotal evidence that NHS Trust Hospitals are changing their habits merely when an ISTC program is announced in their market area. As a result, it is expected that competition will increase, likely leading to an increase in research on health care competition in England.

Physician Ownership in Health Care

Separately, one must assess the uniqueness of the role of the physician in health care. Much of the debate in the US has been on the increasing physician ownership of specialty hospitals. Though this debate does not yet directly apply to England, the research can provide key insights into incentives, potential motivations and the consequences of physician ownership in clinical service provisioning.

Prominent in the US debate was the fear that physician ownership in specialty hospitals could cause supplier induced demand (ASHA 2003). General theory predicts that specialty hospitals with significant physician ownership will treat higher volumes

of profitable surgical diagnosis-related groups (DRGs), lower severity cases, and focus on privately insured patients, compared to facilities not owned by physicians. The greater the complexity, the lower the profitability and theory predicted the uninsured would be referred to general hospitals. However, the research conducted by the United States Government General Accounting Office (GAO), CMS and the MedPAC found no evidence that this practice existed (GAO 2003; Hackbarth 2005; Leavitt 2005).

With respect to the ISTC Programme, there is some evidence of increased efficiencies in ISTCs in comparison to the NHS. Anastasiou (2005) examined the utilisation of operating theatres and, using the example of BUPA Redwood, found different levels of utilisation between Redwood and the NHS average. Measuring three types of utilisation figures and then calculating an overall score, the study compared the targets set by the Audit Commission in 2003, the average NHS results as detailed in the Healthcare Commission Review in 2005, and results from BUPA Redwood. The overall target for theatre utilisation was 77.0%, but the NHS overall result was only 56.9%. BUPA Redwood, which scored higher than the NHS in every section, had an overall score of 81.0%, above even the Audit Commission's optimistic target.

However, a major weakness of this is that it compares NHS Trust Hospitals with ISTCs. It is therefore possible the superior performance of ISTCs is due to their specialty focus, rather than their private ownership. It must be noted that the Redwood facility uses NHS seconded consultants, which seems to suggest the difference in utilisation lies either in the private management of the facility and/or the separation from the larger NHS Trust Hospital priorities.

2.3.3 Ownership Summary

Whether privatization actually leads to an improvement in efficiency has been the subject of what appears to be a considerable amount of research, both theoretical and empirical. The literature review is primarily concerned with whether private ownership leads to a higher efficiency than public ownership. However, several factors, independent of the private-public distinction, intervene in the relationship between ownership and efficiency, such as the level of regulation and competition in the market. The literature indicates this is true for health care specifically, as well as in general.

From a theoretical perspective, it can be concluded that ownership does matter in the sense that changes in the principal-agent relationship, motivation, or incentive structures in place, are likely to have significant effects on firm behaviour. However, it is difficult to be precise on the effects of ownership structure as these are dependent on the relevant institutional environment, framework of regulation, the market structures of firms in which they operate and other factors. As a result of this complex set of interactions, the empirical results do not always support the theoretical prediction of higher efficiency.

2.4 Competition

There has been a great deal of literature written on competition, in general, and competition in health care specifically. In this section we will review briefly the literature that has been published in this area. The literature will briefly review the general theory of competition, followed by literature specific to competition in health care.

2.4.1 General Theory on Competition

The primary economic argument for competition is that it has a significant effect on a firm's behaviour and performance. The competitive process drives internal efficiency and serves as a mechanism conducive to allocative efficiency (Vickers and Yarrow 1988). Further, it is entirely possible to have competition, and with it all the benefits of competition, between publicly owned entities without any participation from the private sector (Le Grand 2007).

Vickers and Yarrow (1988) present some of the most comprehensive analysis on the subject of competition in light of the British privatization program during the Thatcher-era. This analysis is directly relevant in the NHS's own attempts to reform itself. There are a number of issues to consider in creating a competitive market. The first is the trade-off between allocative efficiency and economies of scale. There is also the related question of whether free entry into the market can lead to losses of cost efficiency within the system as a whole. Restricting entry into the market is an argument often advanced by industries with economies of scale, such as the health sector. The theory is that free entry leads to the undesirable duplication of fixed costs (Vickers and Yarrow 1988; Donaldson and K. 1993; Cookson and Dawson 2006).

Therefore, it could be better to have a few (or even just one) large firms within a market than to have many smaller ones.

The trade-off between allocative efficiency and scale economies is central to many problems in competition policy. Market power is greater when there are fewer firms, and monopolistic behaviour worsens allocative efficiency. This trade-off leads to two very important questions. First, how many firms are needed in a market to maximise social welfare? Clearly, each industry is different and each market is different. For example, the market for the utilities industry could cover an entire country, whereas the health market may be limited to a Strategic Health Authority (SHA) or Primary Care Trust (PCT). Second, does free entry lead to the existence of too few or too many firms at the market equilibrium (Vickers and Yarrow 1988)?

The second issue concerns the role of public enterprises in markets where they compete with private firms. There are a number of reasons why competitive forces may improve industry performance where public enterprise exists. First, competitive threats upon the managers of public firms will enhance internal efficiencies (referred to as a 'disciplining effect').[3] A second advantage of competition is that it fosters innovation. Rival firms might have the incentive to produce new products or processes into parts of the public firm's market, which in turn acts as a spur to the public firm to be more innovative itself (Vickers and Yarrow 1988). Innovation clearly yields long-run efficiency gains (Schumpeter 1943) and a stated goal of the ISTC program is to encourage the development of new techniques for providing care (Health Committee 2006).

A third advantage is that the mere potential for an introduction of competition or the threat that another firm might enter can increase efficiency. The threat of potential competition upon the incumbent firm, or firms, compels them to meet consumers' demands with maximum efficiency, or else risk losing market share (Vickers and Yarrow 1988; Iglehart 2005; Bian and Morrisey 2006) .

So, why might introducing competition improve health care performance? Following Vickers and Yarrow (1988), we can identify two central arguments. First, providers will operate more efficiently because providers facing competition have an incentive to eliminate organisational inefficiency, or slack. Second, there will be the new entry of efficient providers and exit of inefficient providers.

[3] Indeed, it has been said that the greatest of all monopoly profits is the quiet life.

2.4.2 Competition in Health Care

Though the UK has had much experience with competition in other public service industries (Vickers and Yarrow 1988), there is little evidence of competition in health care delivery. Most of the evidence on competition in health care comes from the United States, since competition between hospitals has been a feature of the US health care market for over two decades. This literature will be discussed followed by the scant English literature that exists on the topic. The research on competition in England's health sector is primarily limited to the experience in introducing a quasi-market via the internal market reforms. Lastly, the most recent literature with respect to the Treatment Centre Programme will be briefly reviewed.

Competition in Health Care: United States

The vast majority of the literature provides evidence that there is competition in the US hospital market. However, the evidence varies on whether the goals of a competitive marketplace – lower pricing, improved quality and better information and access – have actually been achieved.

Research shows that higher volume is associated with better quality and leads to lower per-case costs (Gardener 1992; Eastaugh 2001; Birkmeyer, Siewers et al. 2002), although this varies by clinical specialty and procedure. Furthermore, increased competition means that volume levels are spread more thinly amongst the competing providers in a market. Therefore, when more providers compete for an identical or lower volume of services, quality may decline and per-case costs may actually increase as capacity becomes not fully utilised (Robinson and Luft 1985; Herzlinger 2004; UNISON 2005). Finding the optimal level of volume vis-à-vis number of competitors and then vis-à-vis the specific procedure is difficult.

A key issue in health is information asymmetry. The lack of reliable and accurate information about price and quality means consumers have difficulty identifying and obtaining goods and services they desire, which limits the effectiveness of competition. Most consumers have limited information about their illness and treatment options. Consumer uncertainty about reliability of health care information increases transaction costs, fraud and deception.

Gaynor and Vogt (2003) examined competition in the US hospital industry, in particular by simulating the effect of a merger. The effects of a merger are important to assess because the goals are to generate efficiencies (i.e., economies of scale) as

well as market power, the result which could allow for a hospital to increase or decreases prices in the local marketplace. The authors found that a hospital's price was elastic relative to merger created market power and that demand was relatively inelastic to price. The author's results provide support that not-for-profits exploit market power in the same capacity as for-profit hospitals (Gaynor & Vogt, 2003).

The threat of competition alone, also known as peer effects, appears to be an important determinant of hospitals' efficiency (Baumol, Panzar et al. 1982; Iglehart 2005; Bian and Morrisey 2006). Ferrier and Valdmanis (2005) provide evidence that the more efficient a hospital, the greater the average efficiency of its peers.

The rapid development of a specialty hospital in a particular market has been shown to have a strong influence on competing general hospitals. A case in point is the city of Indianapolis, one of 12 cities or counties that have been studied closely over the past decade by the Center for Studying Health System Change, a non-profit research organization supported by the Robert Wood Johnson Foundation. The research found that the mere threat of a new, physician owned cardiac center in Indianapolis, was sufficient to allow physicians to negotiate a better financial position at existing hospitals (Iglehart, 2005).

The effect of peer competition already seems to be at play within the NHS and the Treatment Centre Programme. There has been substantial anecdotal evidence that NHS Trust Hospitals often changed their habits when the ISTC program was announced (Smith 2006) and private hospitals lowered their spot purchase price (Health Committee 2006). Though ISTCs have so far had a limited impact on volume figures (2006; Health Committee 2006), they have had a major effect on behaviour on the NHS (Timmins 2005). The mere arrival of an independent treatment centre has suddenly made conversations with NHS consultants about how services are organised and how waiting times can be cut much easier (Smith 2006). Simon Stevens, Tony Blair's former health adviser, put it bluntly, stating that if NHS consultants did not perform the operations, there would be "a bunch of Germans coming round the corner who would" (Timmins 2005).

Competition in Health Care: The Role of the Physician

The quote in the previous paragraph by Timmins touches upon the unique role of the physician in the health sector. The vast majority of the literature, as well as this dissertation, is focused on competition between facilities. However, a key aspect of

competition in health care is the role of the physician. Hospitals compete for physicians, but hospitals can also compete against physicians.

In the US, physicians are often investors in specialty hospitals (Devers, Brewster et al. 2003; Iglehart 2005), as in the Indianapolis case. And because most of the physicians who invest in a specialty hospital retain their admitting privileges at a general hospital, they can select which of their patients to admit to the specialty hospital and which to the general hospital.

Another example of how a new specialty hospital can alter referral patterns is the Oklahoma Heart Hospital, which, when it opened in 2002, had a significant impact on the nearby Oklahoma University Medical Center. The number of inpatients admitted for cardiac care plummeted at the University Hospital after 16 surgeons and cardiologists on the clinical faculty began to refer all their patients to the specialty hospital. The medical centre said that it lost $11.6 million in cardiology operating income between 2002 and 2004 as a consequence of the shifting of patients to the specialty hospital (Iglehart, 2005).

The flight of physicians from NHS Hospitals for specialty hospitals has not yet happened in England. However, there is a competitive market in place for NHS physicians working extra hours for the independent sector. This has an impact on reducing wait lists and increasing access to the NHS patient population. In Exeter, for example, NHS patients who had been told they would have to wait months for a hip replacement suddenly found themselves being offered one at the local NHS hospital within days or weeks of an independent treatment centre opening up nearby (Timmins 2005).

However, there are also arguments to regulate competition in the health sector. A key concern is supply-induced demand. In 1974, the US Congress required every state to have a certificate of need (CON) program (Tanner 2002) to restrict the development of health care facilities. CONs were intended to control the potential over-supply of health facilities in a state. Shortly thereafter, Congress lifted the CON restriction and a number of states did away with their programs (McGinley 1995).

Although more than 70% of states still continue use CONs to regulate the development of health care services in some capacity (AASC 2006), these regulations have been loosening in recent years. An important decision by the Federal Trade Commission and Department of Justice (2004) concluded that barriers to entry should be removed, and the existing players should not be allowed to block the entry of new

competitors. Again, Shortell and Hughes (1988) found statistically significant correlations between higher mortality rates and the strictness of hospital regulation in a state.

Competition and Quality

Evidence on the correlation between competition and quality of care is more limited and contradictory (Romano and Mutter 2004). The bulk of the empirical evidence for Medicare patients shows that quality is higher in more competitive markets, though empirical results for privately insured patients are mixed across studies (Gaynor 2006). Others suggest competition has a negative or negligible effect on quality (Kessler and McClellan 2000; Volpp, Ketcham et al. 2005). Shortell and Hughes (1988) found no statistically significant association between mortality rates among inpatients and either the type of hospital ownership or the number of hospitals competing in the market area.

Kessler and McClellan find that hospital competition improved quality of care, as measured by one-year mortality rates and readmission rates, following admission for acute myocardial infarction (AMI). In this respect, its findings conflict with those of other US studies which have suggested that competition has a negative or negligible effect on quality (Shortell and Hughes 1988, Volpp and Buckley 2004, Volpp et al. 2003, Sari 2002).

Gowrisankaran and Town (2003) studied the impact of competition on Medicare and Health Maintenance Organisation (HMO) patients in Southern California. The research methodology used was similar to the methodology employed by Kessler and McClellan. The authors' findings were mixed. The evidence suggests that as competition increased, mortality fell for HMO patients, but rose for Medicare patients.

Further, there have been a number of studies on whether competition leads to improved or weakened quality. A number of studies in health found an inverse relationship between the level of competition and quality. One such study by Shortell and Hughes found no statistically significant association between mortality rates among inpatients and either the type of hospital ownership or the number of hospitals competing in the market area (S. Shortell & Hughes, 1988).

The objective of a New Jersey study was to determine whether hospital mortality rates changed in the state after implementation of a law that changed hospital payment

from a regulated system based on hospital cost, to price competition with reduced subsidies for uncompensated care. The study also hoped to determine whether changes in mortality rates were affected by market conditions (Volpp, Ketcham, Epstein, & Williams, 2005).

The study found that mortality among patients in New Jersey improved less than in New York by 0.4 per centage points among the insured and 0.5 per centage points among the uninsured. There was a relative increase in mortality for patients with AMI, congestive heart failure, and stroke, especially for uninsured patients with these conditions, but not for patients with the other four conditions studied. Less competitive hospital markets were significantly correlated with a relative decrease in mortality among insured patients (Volpp, Ketcham, Epstein, & Williams, 2005).

The researchers concluded that market-based reforms may adversely affect mortality for some conditions but it appears the effects are not universal. Insured patients in less competitive markets fared better in the transition to price competition (Volpp, Ketcham, Epstein, & Williams, 2005).

In defining competition, researchers must define a competition market area. Most studies use geographic market concentration to estimate hospital competitiveness, or market power, and found that distance was a predictor of hospital choice. These approaches assume that distance alone determines hospital choice. However, Tay (2003) argues that quality differentiation should be an important element for Medicare patient decision-making, since such patients are unaffected by prices.

Tay looks at the importance of quality differentiation to assess hospital market competition. She finds that patient demand is responsive to both distance and quality and therefore, substitution toward alternative hospitals in proportion to current market shares implies that geographic market concentration is an inadequate measure of hospital competitiveness. Tay finds that quality too plays a significant role in a heart attacks patients' choice for hospital care, even though such patients may be less willing to travel long distances to higher quality hospitals than patients with other diagnoses. One can expect that distance matters less and quality more in other diagnoses where care is less urgently sought, implying the effects of quality competition are of even greater intensity (Tay, 2003).

There is relatively little evidence from England, the UK, or even the whole of Europe, on the correlation between competition and quality of care, as the health sector has been severely regulated across the continent (Burgess 2005). Propper, et al.

(2000) investigated whether competition between hospitals improve quality of care in the United Kingdom. The researchers looked at hospital death rates from cardiac arrest (AMI) from 258 hospital trusts, while controlling for level of competition, hospital size, and distribution of AMI patients. The researchers found that competition does reduce quality with hospitals located in more competitive areas having higher death rates, while controlling for hospital characteristics, actual and potential patient characteristics. However, the researchers admit that the estimated impact of competition on quality is small, stemming from the fact that UK hospitals do not generate profits, and therefore there is little to no incentive to profit maximise (Propper, Burgess et al. 2000).

Competition normally means consumers choose between price and quality. As there is little, or no, price competition in the UK, a consumer will be responsive primarily to quality. The evidence suggests that competition with fixed prices drives up quality (Carol Propper, Burgess, & Green, 2000). However, providers will have an incentive to focus on costs, which may create an environment of risk selection (i.e., selecting those patients that are cheaper to treat) as well as providing services that are lower in cost or at minimum where the costs are predictable.

Another consequence of increased competition is that volume levels will decrease in some facilities. Skinner stated that repetition breeds competence (1974). The inverse should also be true; competence decreases as volume decreases. This is especially important in health, where hospitals and professionals need minimum volume levels for certain procedures. It has been stated that the ISTCs are reducing volume levels in NHS Trust Hospitals (UNISON 2003) and therefore reduce quality in the system as a whole, as volume levels are spread amongst many more providers.

Competition: At What Level?

There has been recent debate over where policy-makers should emphasise promoting competition. While most researchers have studied competition at the hospital level, Michael Porter and Elizabeth Teisberg recommend assessing competition at the level of the individual. They argue that the current failings of the market are due to competition currently taking place at the wrong level: the level of health plans, networks, and hospital groups. They recommend that policy-makers instead eliminate provider networks and encourage "informed, financially responsible

consumers to choose the best provider for each condition" (M. Porter and E. Teisberg, 2004).

In contrast, Enthoven and Tollen argue that competition among Integrated Delivery Systems (IDS's) is a more promising approach than the fragmented physician practice-level model that Porter and Teisberg propose to encourage high quality and efficiency. Enthoven and Tollen propose that IDS's should provide incentives for professionals to provide coordinated, efficient, evidence-based care, supported by state-of-the art information technology. Enthoven and Tollen further argue that there should be a limited number of large providers to ensure continuum of care and efficiency in the local health system as a whole. From this argument, they would likely be opposed to the introduction of ISTCs that may fragment health care provisioning (Enthoven 2005).

Further, Enthoven and Tollen suggest that the reason markets have not produced competition among IDS's is the widespread employer practice of offering only one insurance carrier, which, in turn, offers only one delivery system. Seventy-seven per cent of insured employees are offered only a single carrier. Ten carriers, each offering every Fee for Service (FFS) doctor in town, is no more competition, than one carrier offering three design plans (HMO, PPO, point of service), and all using the same doctors. Offering different carriers is a necessary but not sufficient condition for competition among delivery systems (Enthoven 2005).

There are a number of potential limitations, or harms, specific to health care that may come out of competition:

- exploiting reimbursement distortions;
- capitalising on conflicts of interest;
- disruption of general facility cross subsidies;
- information asymmetry.

Information problems can limit the effectiveness of competition. The lack of reliable and accurate information about price and quality means consumers have difficulty identifying and obtaining goods and services they desire. Most consumers have limited information about their illness and treatment options. Consumer uncertainty about reliability of health care information increases transaction costs, fraud and deception.

Competition in Health Care: United Kingdom

Health care markets are usually thought to differ from other competitive markets in a number of ways: the product is differentiated, information is imperfect, government regulation is extensive and many firms are not-for-profit (Burgess, 2005).

As prices are fixed in the UK, providers are encouraged to compete in terms of quality and cost, rather than price. This focus on cost minimization may foster risk selection (i.e., selecting those patients that are cheaper to treat) and provision of services that are lower in cost or, at minimum, where costs are predictable.

As discussed previously, Propper, et al. (2000) was one of the first to investigate the correlation between competition and quality in the UK. The researchers found that competition does reduce quality, with hospitals located in more competitive areas having higher death rates, while controlling for hospital characteristics, as well as actual and potential patient characteristics. However, the researchers admit that the estimated impact of competition on quality is small.

In the 1990s, the UK introduced the internal market. Alain Enthoven is thought to be the person who brought the internal market idea to the UK, following his publication in 1985 of "Reflections on the Management of the National Health Service". This internal market would maintain a tax-funded program of universal access, free at the point of service, but created market forces in the NHS to incentivise for improvement in efficiency and quality of care (Enthoven 2000).

Enthoven found that the internal market reforms did little to introduce market incentives, stimulate innovation and increase efficiency, because the essential conditions for the market to operate were never fulfilled (Enthoven 2000). Enthoven stated that on a scale of zero to ten, where zero is a totally centrally planned and managed system and ten is the regulated but relatively free US economy, the internal market got the NHS to somewhere between two and three for a year or two, before central control increased (Enthoven 2000).

Enthoven's assessment was further supported in a 1998 review by Julian Le Grand and other prominent health services researchers which found that "competition within the market was limited...The essential conditions for a market to operate were not fulfilled" (Le Grand, Mays et al. 1998).

Though the District Health Authorities were not seen as strong drivers of competition (Le Grand, Mays and Mulligan 1998), there are well-established effects

of General Practice Fundholding. These include reduced hospital prices for non-emergency treatment (Propper 1996; Propper and Soderlund 1998), reduced waiting times for non-emergency treatment (Dowling 1997; Propper, Wilson et al. 1998; Propper, Croxson et al. 2002; Dusheiko, Gravelle et al. 2004) and reduced referral rates (Gravelle, Dusheiko et al. 2002; Dusheiko, Gravelle et al. 2004).

Patient choice – like payer choice – can help to reduce waiting times, and encourage convergence in waiting time between providers, by matching referrals with spare capacity. Former UK Prime Minister Tony Blair claimed that patient-driven hospital competition would reduce inequalities of access: "Choice mechanisms enhance equity by exerting pressure on low-quality or incompetent providers (Cookson and Dawson 2006)." However, patient choice is a relatively new phenomenon, beyond the scope of this dissertation.

Competition in Health Care: The Treatment Centre Programme

The stated goal of the NHS with the introduction of the ISTC's was to add capacity and create a competitive market. It was believed these two goals would be mutually reinforcing. A competitive market would add capacity and added capacity would create a competitive market (Commercial Directorate 2005; Anderson 2006).

There is anecdotal evidence that NHS Trust Hospitals are increasing their efficiency. Further, the current ISTC programme has been shown to act as a change agent for the way health care is being delivered in England (Commercial Directorate 2004). Prior to this programme, the private medical provider market in England could be characterised as a somewhat niche high-cost, low-throughput business where the private medical insurers are its primary customer. As a result, the NHS on average was paying in excess of 40% of current HRG tariff prices to augment local capacity—i.e. spot purchasing. The ISTC programme is driving a dramatic shift in private provision (Commercial Directorate 2004). The incumbent providers are 'retooling' their businesses to be far more competitive (Commercial Directorate 2004). After losing out in the first wave if ISTCs, Capio and Nuffield Hospitals, who see the NHS as their major source of business, cut their prices to close to the NHS tariff. Even the UNISON has acknowledged that if the ISTCs have accomplished anything, they have driven down the cost of private hospital services to the NHS (UNISON 2005).

In Exeter, for example, NHS patients who had been told they would have to wait months for a hip replacement suddenly found themselves being offered one at the

local NHS hospital within days or weeks of an independent treatment centre opening up nearby. Equally, NHS managers have reportedly found it much easier to negotiate cheaper fees with their consultants for extra work, with payments well below the standard BUPA rate, whether that extra work is undertaken internally in the NHS or as a 'structured secondment' to an independent treatment centre. At the moment, this evidence is largely anecdotal. It is the outcome, however, that competition is intended to produce (Timmins 2005). The ISTCs effect on lowering the cost of private sector services and its effects on the NHS providers and has been noted previously in the research literature.

2.4.3 Competition Summary

Health care markets are usually thought to differ from competitive markets from other sectors in a number of ways: the product is differentiated, information is imperfect, government regulation is extensive and many firms are not-for-profit. This has implications for the operation of choice-based policies reviewed (Burgess, 2005).

As prices are fixed in England, providers seek to profit maximise by increasing the number of procedures performed (by attracting more customers with higher quality care) and by controlling cost. The latter focus can encourage risk selection (i.e., selecting those patients that are cheaper to treat) and a focus on low-cost, or at a minimum, predictable cost, services.

Furthermore, it may be argued that rather than the focused approach, it is the introduction of competition to England's health care system that is increasing efficiency. The literature strongly suggests that competition increases efficiency and quality (Vickers and Yarrow 1988). However, the evidence is not so strong, as illustrated in the literature review with regard to quality.

2.5 Summary

This chapter reviews the research evidence concerning efficiency, quality, ownership and competition as related to Treatment Centres (TCs). In terms of efficiency, the evidence is quite clear. At the basic level, treatment centres tend to have lower costs, provide higher volumes and have better margins than general hospitals. When the entire health system is considered, however, the evidence is less clear, with some evidence suggesting that providing additional capacity leads to higher costs to the system as a whole.

With respect to quality, on balance, the evidence does suggest that higher volume leads to improved quality outcomes. For specific clinical procedures treatment centres typically have higher volumes and theory predicts this repetition will lead to higher quality. In practice however, evidence from the US is unclear about whether treatment centres do indeed provide better quality outcomes than competitor general hospitals when adjusted for case mix. That said, the evidence does suggest that, at minimum, these types of facilities provide services of no less quality.

The principal results for ownership suggest that ownership plays an important role in the principal-agent relationship and helps determine the motivation of the parties involved. More important, however, is to understand how ownership matters in aligning the incentives appropriately. It is argued that the objectives of private firms will be driven by the relative potential for owners to sell if they are not satisfied with managerial performance, the threat of the take-over by another firm, potential for bankruptcy and the loss of managers due to the competitiveness in the labour market.

Competition is an important confounding variable to the research. However, competition has not historically played an important role in the NHS. As a result of the unique characteristics of the NHS, policy-makers have attempted to implement an Internal Market in the previous decade. Today choice is on the agenda as a means to provide the same incentive structures that would take place in a competitive market. There appears to be much scope for further evaluation of the effect these competitive market forces in the English market have so far had and how it affects the NHS's goals of increasing capacity and choice.

Chapter 3

Research Design and Methods

The acquisition of knowledge is the mission of research, the transmission of knowledge is the mission of teaching and the application of knowledge is the mission of public service

James A Perkins, 1966

3.0 Introduction

The objective of the research is to assess England's Treatment Centre Programme and draw out information as to whether variations in quality of care and efficiency are due to ownership status (public or private), treatment centre focus (treatment centre or general hospital) or other variables. This chapter discusses the research design and the methodological approach.

This chapter is divided into five sections. Section 3.1 explains the research design. Section 3.2 describes in more detail the quantitative research methodology. Section 3.3 describes in more detail the qualitative research methodology. Section 3.4 addresses some key limitations to the research. Section 3.5 provides concluding remarks.

3.1 Research Design

The research design uses a combined quantitative and qualitative approach, often referred to as 'mixed methods research' (Adamson 2005). The quantitative analysis is undertaken to provide an initial assessment of performance and initiate the hypothesis that there are differences in performance between the Treatment Centres in England. The research is followed by the qualitative approach using the comparative case study design.

For practical reasons, the quantitative research will be on a retrospective basis, as opposed to an experimental basis. This means the researcher will analyse the data and variables of interest on a retrospective basis (Bryman and Cramer 2005). Such studies have also been labelled 'after the fact,' or 'ex post facto' (Robson 1993). In such

cases, the event has already occurred and the retrospective study investigates possible cause and effect relationships (Bryman and Cramer 2005).

Rather than creating an experiment, the research will rely on existing data from England's National Health Service. A retrospective study design has been chosen because of the interest in assessing the manipulation of the variables and drawing out potential confounders to the results. This research method appears to be best suited for the goal of assessing the Treatment Centre Programme in England (the primary source of data for the research) and how ownership may account for differences in performance in terms of efficiency and quality.

The quantitative analysis simply tells us something about correlation, not causation. A key weakness with a purely quantitative analysis approach is that a number of the ISTCs are just coming on line and are therefore not fully operational. Furthermore, often the NHS TCs are not seen as independent units, and as a result, are incorporated operationally and statistically into the entire Trust Hospital. Therefore, there is a danger that the quantitative data by itself may not permit meaningful conclusions. For that reason it is necessary to assess the evidence more deeply.

Therefore the quantitative analysis is complemented by a supporting qualitative analysis. Adamson (2005) uses the term 'complementarity,' with the general goal being that the strengths of one method is used to enhance the other. The comparative case study design has been chosen as the primary approach for qualitative research. The qualitative approach relies on multiple sources of evidence to 'triangulate' research questions (Yin 1994; Adamson 2005); these sources include a review of relevant literature, documentary analysis, and primary sources of data such as interviews with Department of Health and private sector operators. The use of a qualitative approach to support evidence and conclusions made from the quantitative approach minimises threats to internal validity and external validity (Campbell and Stanley 1963; Cook and Campbell 1979), ensures generalisability (O'Rourke 2005) and, ultimately, helps draw out meaningful conclusions.

3.2 Research Methodology: Quantitative

Ideally, for our research purposes, there would be two health systems, identical except for their ownership and the efficiency and quality of healthcare provided. The effect of the independent variable, ownership, could then be assessed on the efficiency and quality of healthcare provided using quantitative methodology (see 3.2.5). Such a

system does not exist, but the TC Programme provides a reasonably close approximation.

3.2.1 Treatment Centres

The TC programme was established as an additional, more convenient, means for patients to receive care. The business model of the TC is to conduct only elective surgeries within a number of specific procedures. By limiting themselves to elective patients, providers can predict patient arrivals and surgery times. Predictability allows for a smoothing operation within a facility and for resources to be used more effectively and efficiently (Gallivan and Utley 2005). Because elective surgeries continue to be available at traditional NHS Trust Hospitals and Private Hospitals, the assessment of elective surgeries allows for the drawing of valid comparisons between the different types of providers. Furthermore, because some TCs are privately run and some are publicly run, the role of ownership can be assessed.

In the quantitative work, there are four categories of providers compared: ISTCs, NHS TCs, NHS Trust Hospitals and Private Hospitals. In some cases, the Primary Care Trust (PCT) themselves have their own facility which treats patients. These patients have been grouped alongside the NHS Trust Hospital category.

Table 3.1 Four Categories of Providers Compared

Facility Type / Ownership	Private	Public
Treatment Centre	ISTC	NHS TC
Hospital	IS Hospital Providers	NHS Trust Hospital (and PCTs)

3.2.2 Data Collection and Periods Examined

Data from the four types of providers are derived from Dr. Foster 2007 data. Dr. Foster is a joint venture partnership between the United Kingdom's Department of Health and Dr Foster Holdings LLP. Dr. Foster is one of two data sources which receive NHS patient record data, with the other being Hospital Episode Statistics (HES).

Dr. Foster was chosen as the quantitative data source over the HES data, primarily because the data is more current. The researcher was able to obtain full year 2007 data from Dr Foster, whereas with HES data the data available as of January 2008 would

only have been from April 1, 2006 through March 31, 2007. It is important to note that using the most current data is especially important with the Treatment Centre Programme, because these facilities have only come on line in the past few years and the volume ramp-up of patients has taken some time.

3.2.3 Research Population and Data Content

Dr Foster data consists of individual patient records – defined as a Finished Consultant Episodes (FCE) - of every NHS patient treated as a day case or inpatient in England. Each patient record includes a number of data 'fields', containing demographic (e.g. age, gender) and clinical information (e.g. diagnosis, procedures performed). The data is from year 2007 (January 1, 2007 – December 31, 2007). Because of concerns regarding the use of patient level data and confidentiality, the patient names, provider name and other specific indicators (e.g. age and deprivation) were blinded.

The patient population studied is patients that receive elective care within specific Health Resource Groups (HRGs). HRGs are the United Kingdom's version of the Diagnosis Related Grouping (DRG) reimbursement methodology. The idea of the HRG, or DRG, is to provide a prospective payment to a provider for a certain procedure related to a grouping number. Like DRGs, the 573 HRGs are based on diagnostic codes from the international classification of diseases (as well as, sometimes, the age of the patient) (Appleby and Thomas 2000). One of the benefits of the HRG system is that it allows health authorities to compare hospitals in terms of efficiency and quality (Benton, Evans et al. 1998; Appleby and Thomas 2000; Epstein, Mason et al. 2004; Street 2004).

The top HRGs contracted by the Commercial Directorate (CD) are cataract surgeries, hip and knee replacement surgery, hernia repair and arthroscopies. The specific HRGs that will be analysed are cataract surgeries (B14), hip replacement surgeries (HRG01) and hernia repair (F72), and are further detailed in the table below.

Figure 3.1 Health Resource Groups (HRGs)

- Cataracts
  - B13 Phakoemulsification Cataract Extraction and Insertion of Lens
- Hernias
  - F71 Abdominal Hernia Procedures >69 or w cc
  - F72 Abdominal Hernia Procedures <70 w/o cc
  - F73 Inguinal, Umbilical or Femoral Hernia Repairs >69 or w cc
  - F74 Inguinal, Umbilical or Femoral Hernia Repairs <70 w/o cc
- Orthopaedic Procedures
  - H04 Primary Knee Replacement
  - H10 Arthroscopies
  - H19 Soft Tissue or Other Bone Procedures - Category 2 <70 w/o cc
  - H21 Muscle, Tendon or Ligament Procedures - Category 2
  - H71 Revisional Procedures to Hips
  - H80 Primary Hip Replacement Cemented
  - H81 Primary Hip Replacement Uncemented

These HRGs were chosen because they are the highest volume procedures within the ISTCs and NHS-run TCs, accounting for 10% of total elective surgical procedures (Dr Foster 2008), and will therefore present a significant number of case records to assess quantitatively. The patient population studied will be the patients that receive elective care within these specific HRGs. In total, over 480,000 patient records (in the form of FCEs), have been selected for study within these HRGs. The table below provides the FCEs for each HRG and by facility type.

Table 3.2 FCEs by HRG and Facility Type

HRG	Facility Type	FCEs	Per cent of FCEs
Cataracts			
B13	ISTC	3,196	1.3
	NHS-Run TC	1,666	0.7
	NHS Trust Hospital	233,504	97.6
	Private Hospital	870	0.4
	Total	239,236	100.0
Hernias			
F71	ISTC	23	0.7
	NHS-Run TC	63	1.8
	NHS Trust Hospital	3,427	97.4
	Private Hospital	7	0.2
	Total	3,520	100.0
F72	ISTC	109	1.3
	NHS-Run TC	140	1.6
	NHS Trust Hospital	8,223	96.8
	Private Hospital	22	0.3
	Total	8,494	100.0
F73	ISTC	34	1.3
	NHS-Run TC	59	2.2
	NHS Trust Hospital	2,589	96.2
	Private Hospital	8	0.3
	Total	2,690	100.0
F74	ISTC	379	3.1
	NHS-Run TC	264	2.1
	NHS Trust Hospital	11,703	94.3
	Private Hospital	58	0.5
	Total	12,404	100.0
Hips/Knees			
H04	ISTC	2,100	4.0
	NHS-Run TC	2,179	4.2
	NHS Trust Hospital	47,064	89.7
	Private Hospital	1,138	2.2
	Total	52,481	100.0
H10	ISTC	4,734	5.2
	NHS-Run TC	2,692	3.0
	NHS Trust Hospital	80,435	88.9
	Private Hospital	2,658	2.9
	Total	90,519	100.0
H19	ISTC	24	2.4
	NHS-Run TC	42	4.2
	NHS Trust Hospital	913	91.9
	Private Hospital	15	1.5
	Total	994	100.0
H21	ISTC	43	2.1

	NHS-Run TC	50	2.5
	NHS Trust Hospital	1,895	93.5
	Private Hospital	38	1.9
	Total	2,026	100.0
H71	ISTC	33	0.7
	NHS-Run TC	130	2.7
	NHS Trust Hospital	4,703	96.2
	Private Hospital	22	0.5
	Total	4,888	100.0
H80	ISTC	1,192	4.7
	NHS-Run TC	627	2.5
	NHS Trust Hospital	22,563	89.9
	Private Hospital	716	2.9
	Total	25,098	100.0
H81	ISTC	526	3.8
	NHS-Run TC	940	6.8
	NHS Trust Hospital	12,225	88.5
	Private Hospital	123	0.9
	Total	13,814	100.0

The table below illustrates the number of providers by HRG category.

Table 3.3 Number of Providers by HRG Category

Number of Providers	ISTC	NHS TC	NHS Trust	Private H.	Total Prov.
Cataract					
HRG = B13	5	4	213	4	226
Hernias					
HRG = F71	4	6	265	3	278
HRG = F72	10	6	298	5	319
HRG = F73	7	6	273	4	290
HRG = F74	12	6	299	7	324
Hips/Knees					
HRG = H04	8	6	236	17	267
HRG = H10	13	7	301	19	340
HRG = H19	4	6	205	2	217
HRG = H21	7	4	203	4	218
HRG = H71	5	5	216	7	233
HRG = H80	8	5	240	19	272
HRG = H81	8	6	221	8	243

The HRGs have been organised according to the amount of healthcare resources a typical patient would 'consume' in a hospital. For example, category H17 is 'soft tissue for other bone procedures for patients aged less than 70 years without complications and comorbidities.' All patients given this classification on discharge would be expected to remain in hospital for a similar length of time and to use a similar amount of healthcare resources (Appleby and Thomas 2000).

However, with the HRG system is not without complications. For example, H17 includes both simple lipomas and some soft tissue sarcomas that are costly to treat and for which patients are seen at supraregional centres. Even with additional editing of the cases for which patients have long stays in hospital, this attempt to standardise the 'inputs' (the patients) to reduce cost variations arising from different case mixes is not perfect (Appleby and Thomas 2000).

Furthermore, there is currently a discrepancy between the way that HRGs are recorded in the hospital clinical datasets and the way that they are used for reimbursement. An HRG for the patient is recorded in the hospital clinical datasets each time the patient leaves the care of a specialist. This constitutes a FCE. However, after leaving the care of one specialist, a patient may be transferred to another specialist within the same admission, meaning an inpatient spell (admission) can consist of more than one FCE. Hospital inpatient and daycase activity is recorded for administrative purposes as per HRG FCE, but the contract currency for the tariff is per HRG spell. In order to be reimbursed, the hospital must convert the (possibly) multiple HRG FCEs per patient into a single HRG spell per patient (likely the most costly HRG that took place during the admission is selected).

Another consequence of this discrepancy is that hospital costs are reported to the Department of Health (DH) as per HRG FCE. The DH adjusts the data on a national aggregate basis to convert hospital costs per FCE to hospital costs per spell, in order to set the HRG spell tariff. This national tariff is adopted for several reasons: it facilitates patient choice by ensuring money flows with the patient; it allows plurality of provision, with all purchasers using the same contracting framework with all providers; it provides incentives for providers to do more activity and for purchasers to implement better control over the demand for hospital services; it provides incentives to reduce costs and increase productivity; and it ensures greater transparency and fairness in the purchasing process (Epstein, Mason et al. 2004).

The reason reimbursement is per spell, not per FCE, is so there is no incentive for the provider to increase its income by transferring patients unnecessarily between specialists within the same inpatient stay. The consequence of the adjustment to the cost data is discussed in the analytic section (Epstein, Mason et al. 2004).

3.2.4 Selection of Variables

Efficiency

HRGs, though flawed, allow for grouping health inputs like-for-like comparisons, but a different measure is needed for assessing health outcomes. In this research we assess efficiency with average length of stay (ALOS) in hours/days (measured from time of admission to the time of discharge), but there are obvious limitations to the use of ALOS as a unit of efficiency. Other potential efficiency components, such as operating room (OR) time, OR's used-per-day versus number of OR's in total, and surgeries per doctor per shift, may be better measures of efficiency. However, this data is not reported to a central NHS database. With these limitations, ALOS is the best measure of comparison and is therefore used here.

One of the advantages of using ALOS is that it does allow for apples-to-apples comparisons between TCs and hospitals (NHS and private). Further, there is a direct relationship between ALOS and total volume within a facility. However, a weakness of using ALOS is that it normally is a determinant for inpatient stay. As treatment centres move toward day surgery procedures, data by the hour or minute is not available and for some of the HRGs the vast majority of procedures are day cases (ALOS of 0). As a result, the per centage of day case out of total procedures was used for these HRGs. These HRGs are:

- B13 Phakoemulsification Cataract Extraction and Insertion of Lens
- F71 Abdominal Hernia Procedures >69 or w cc
- F72 Abdominal Hernia Procedures <70 w/o cc
- F73 Inguinal, Umbilical or Femoral Hernia Repairs >69 or w cc
- F74 Inguinal, Umbilical or Femoral Hernia Repairs <70 w/o cc
- H10 Arthroscopies
- H19 Soft Tissue or Other Bone Procedures - Category 2 <70 w/o cc
- H21 Muscle, Tendon or Ligament Procedures - Category 2

Quality

Another important variable is quality. A major concern of the Treatment Centre Programme (specifically ISTCs) was that quality would be negatively affected. As a result, performance should not just measure how quickly patients are discharged, but also that the procedures were conducted appropriately.

However, there are many different definitions of quality. Quality may be defined and measured in terms of health outcomes indicators such as mortality. It could refer to patient satisfaction with the services provided. It may refer to the outputs and productivity of the overall health system such as hospital discharges and waiting lists. It may also refer to the inputs within a health system such as physicians, physician to bed ratio, nurses, facilities and equipment (beds, operating rooms, CTs, MRIs) (Le Grand, Mays et al. 1998). Further, a determination must be made as to at what level shall quality be assessed, whether it is the performance of practitioners or also the contributions of patients and of the health system (Donabedian 1988).

In this research quality outcomes have been chosen as the method of analysis. The best measurement of quality outcomes is from the patient record data. Death rates and patient readmission rates are detailed in the patient record data. Clearly, any changes in death rates and readmissions with the advent of the Treatment Centre Programme can thus be assessed. The death rate indicator used is patient deaths within 30 days of hospitalization (death30). Patient readmission rates are defined as patients readmitted to the hospital within 30 days following discharge (readm38). It must be noted that there is a limitation of these quality measures with respect to the selected HRGs. In particular, not many people die from these types of outpatient procedures (e.g. cataracts, hernias). In spite of this fact, we can still assess whether the Treatment Centre Programme and the use of the independent sector has led to a decrease in quality (e.g. increase in death rates and re-admission rates), as some have argued (Royal College of Physicians 2003; UNISON 2005).

Case Mix

When comparing the quality and efficiency outcomes of health providers it is important that an adjustment is made for case mix, to ensure like-for-like comparisons between providers. This is especially important in light of the fact that treatment centres focus on selecting 'appropriate' patients. Selecting appropriate patients is not only important for efficiency purposes but also because it ensures quality. Treatment centres are not equipped, nor staffed, for when procedures go wrong. As a result, selecting appropriate patients is the method used for minimising clinical risk.

There is evidence that case mix is an important determinant of inter-hospital variation in average cost, utilization of ancillary services, and mean length of stay (Feldstein 1967; Evans 1971; Evans and Walker 1972; Feldstein and Schuttinga

1977). A failure to recognise case mix can lead to serious omission of key variables and biases.

Already back in the 1960s Martin Feldstein suggested that if health authorities could specify a preference function indicating the relative weights attached to different health service outputs (i.e., mix of cases), economic analysts would suggest an appropriate optimising model (Feldstein 1967). The subsequent development of the hospital case mix measure in England goes back to the early 1980s and has been a direct result of the creation of the HRGs. Although there is a case mix classification system in England, it is used less than expected, primarily because hospitals are not funded on the basis of their case mix adjusted activity. Instead, case mix information has mainly been used in benchmarking exercises, such as the government's use of HRG costs to set hospital efficiency targets (Street and Dawson 2002).

To date an agreed case mix method of adjustment has not been developed in the UK. Researchers have adjusted for case mix using a variety of methods. The most common case mix adjustment factor used in the UK is reference costing. In reference costing case mix complexity is taken into account in the following way. First, the average cost for each HRG is calculated, based on HRG price information provided by each hospital in the sample. Second, these average HRG costs are standardised around 1, to create an index of case mix complexity, with 1 indicating the HRG with average complexity. Third, actual activity in HRG is multiplied by the case mix index and these values are summed to derive the number of case mix weighted patients treated in each specialty. Thus, a hospital that treats 1,000 patients who are 2% more complex than the average for the sample is assessed as having treated 1,020 case mix weighted patients (Harper, Hauck, & Street, 2001). There are recognised weaknesses with the use of reference costing based on tariff levels. The most important weakness is that these reference costs may be inaccurate.

However, even though the HRGs are designed to account for individual case mix complexity, the HRG groupings themselves are not well enough refined to account for variations in complexity in the individual patients. For example, some patients may have a number of co-morbidities which are not accepted or considered appropriate for either a treatment centre or a private hospital, and as a result, must be treated in an NHS Trust Hospital by default. As a result of this resultant weakness in the HRG methodology we also use age and deprivation to account for case mix complexity.

Older patients are likely to have above average care requirements. The age of the patient on the date of admission is defined by the age of the patient when admitted. For case mix adjustment 5-year age bands (0*, 1-4, 5-9, ... , 90+) are used, which amounts to 20 age groups (Dr Foster 2008). Appendix A provides a summary of the age bands.

Patients from areas with greater income deprivation may also have above average care requirements and it may also be more difficult to arrange timely discharge. The deprivation indicator is based on Carstairs scores, which provide an index of deprivation at ward level based on an unweighted combination of four census variables: unemployment, overcrowding, car ownership and social class. This data is based on 2001 census data (National Statistics Office 2001). The deprivation codes are as follows: 1 = Least deprived; 2 = Below average; 3 = Average; 4 = Above average; 5 = Most deprived.

3.2.5 Processing the Data

Before the data can be properly analysed, it must be processed. An important aspect of the research was knowing whether the provider site codes were NHS or Private, and treatment centre or General Hospital. The researcher received site codes for the location of the provider. The site codes beginning with R are NHS, those beginning with N are Private Hospitals and those beginning with R and ending with TC should be NHS TCs. ISTCs had their own site codes and had to be assessed separately. The data was imported into and processed with a computer software package and, using Microsoft Excel, a simple formula was used to separate the sites by their codes. The sites were then coded accordingly with dummy variables.

In case of disagreement between the identification criteria, further assessment had to be conducted. For example, patients treated at the Kidderminster Treatment Centre (Site Code: RWPTC) would normally be considered to have been treated at an NHS TC. However, Kidderminster ISTC (Site Code: NTD01) was reporting some cases to the NHS TC site code. The researcher manually separated out procedures areas by HRG. For example, Kidderminster NHS TC did not undertake major joint procedures (until end of 2007). These HRG groups were then allocated to Kidderminster ISTC. As Kidderminster ISTC only focuses on orthopaedic procedure areas, all cataracts and hernias remained under the Kidderminster NHS TC site code. This is the same

methodology used by the York University assessment (Mason, Miraldo et al. 2007) as well as the recommended approach by Dr. Foster (Jones 2008).

For the actual quantitative analysis, SPSS was chosen as the best software to use. It is the most simple software package to use, as it does not require technical skills in computer programming. The goal was to maintain simplicity, both to minimise interpretation problems in the analysis, and to maximise usefulness for general policy-makers.

3.2.6 Quantitative Analysis

The quantitative analysis is undertaken to provide an initial assessment of performance and initiate the hypothesis that there are differences in performance between the Treatment Centres. This analysis is not to explain causation or prediction, but rather to obtain initial correlations and ensure that there are differences in performance and thereby justify the rest of the thesis through ensuring that there is a difference to explain.

To ascertain the relationship between the type of provider and performance, as well as the provider's ownership and performance, three approaches are used. Basic descriptive statistics are assessed to initiate the analysis. This is followed by a weighted mean difference analysis. A multivariate regression methodology is then used. The basic premise with the multivariate regression methodology is to explore the effects of other variables on the dependent variables (efficiency and quality) studied.

Descriptive Analysis

To initiate the quantitative work, basic statistical analysis is conducted. For efficiency indicators inpatient cases and day cases are assessed. For quality indicators death rates and readmission rates are assessed.

For inpatient cases, the number of cases in each procedure area, mean, median, standard deviation and range are assessed. For day cases, the number of cases and day case rate are assessed by each procedure area. Day case rate is the proportion of day cases to the total number of cases within a procedure area.

For death, the number of total cases by procedure area, number of deaths and death rates (per 1,000) are assessed. For readmission, the number of total cases by

procedure area, number of readmissions and the readmission rate (per 100) is assessed.

Weighted Mean Difference

The quantitative analysis is then conducted by pooling the mean difference of the HRGs. The pooled estimates are based on the weighted mean difference (WMD) statistic. The WMD, or 'difference in means', measures the absolute difference between the mean values between two groups. These groupings consist of:

1. ISTC vs NHS TCs
2. ISTC vs NHS
3. ISTC vs. IS Providers
4. NHS TC vs IS Providers
5. NHS vs IS Providers
6. NHS vs NHS TCs

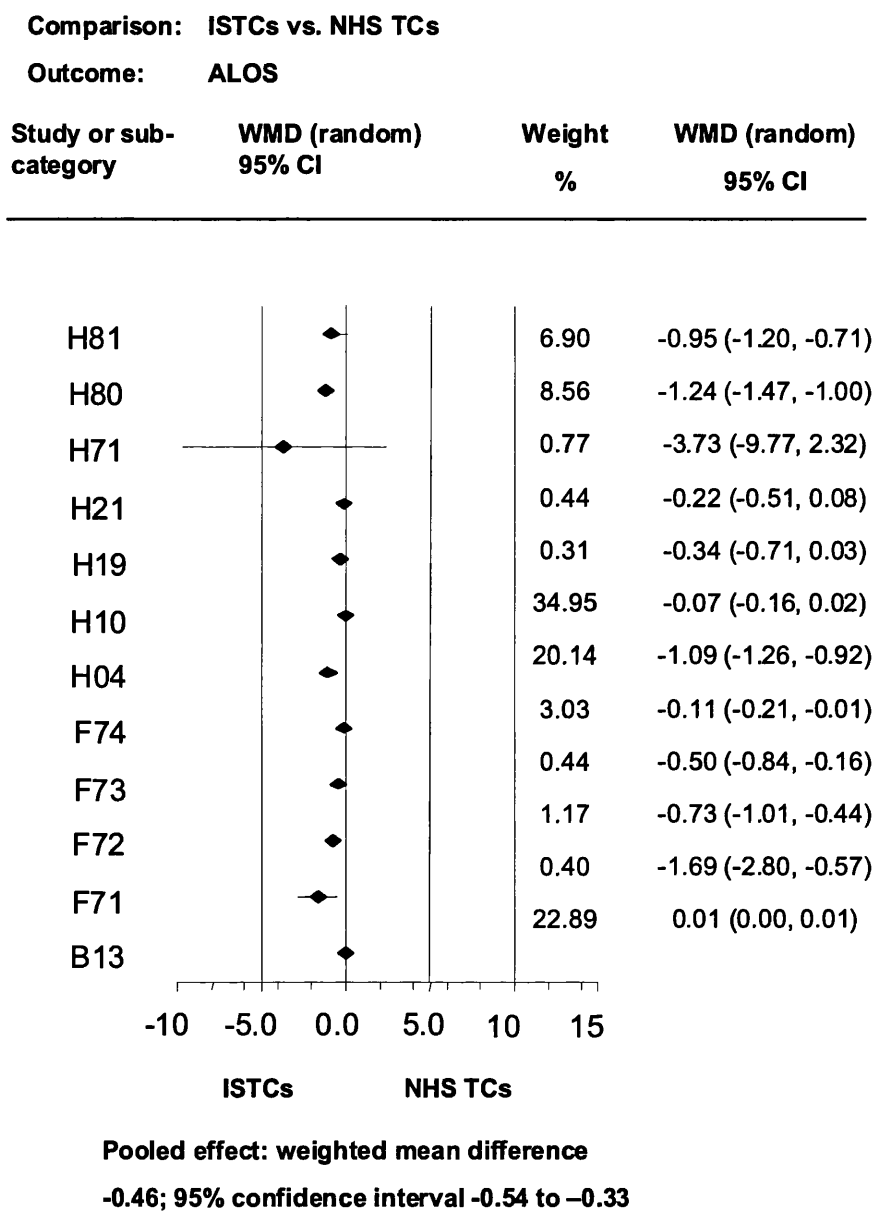
Patients are grouped by HRGs and a number of indicators have been assessed. These indicators include:

1. Length of stay in days (ALOS)
2. Proportion of day cases of total discharges
3. 30 day death rates
4. Inpatient readmissions
5. Age in years
6. Deprivation (IMD) score

Results are presented using forest plots (see figure below), a common methodology used in meta-analysis to compare results across different clinical trials (Mason, Miraldo et al. 2007). The y-axis shows the HRG being assessed (one of the six from above): for example, ALOS. The x-axis shows the mean difference (difference between the means) between the two groups assessed. For each indicator, the figures plot the mean difference (represented as a square) and 95% confidence interval (horizontal line through each square). Where a confidence interval crosses the y-axis (i.e. spans zero), the difference in effect is not significant. Confidence intervals are calculated assuming that patients are a random sample from an underlying population. The 5% level has been selected as the alpha level ($p<0.05$). The weight per centage is the weighting of the total number of cases. This is important as it

illustrates where a case (e.g. B13 cataracts) may have a disproportionate impact on the total pooled effect.

Figure 3.2: Forest plot for ALOS (Days): ISTCs vs. NHS TCs (2007)



Pooled effect: weighted mean difference
-0.46; 95% confidence interval -0.54 to –0.33

Multivariate Regression

Multivariate regression analysis has been chosen as the tool to explore the relationships between multiple variables and efficiency and quality. As opposed to a bivariate analysis, where an analysis is conducted on two variables, the multivariate

analysis is a statistical technique that considers multiple variables simultaneously (Robson 1993; Bryman and Cramer 2005).

The difference in means analysis merely shows that there is a difference in performance. By using multivariate regression analysis to complement the difference in means analysis one can begin to explore the relationships of multiple variables; most importantly in this case, one can explore the impact of ownership and treatment centre focus.

Finally, using multivariate regression analysis allows for the discounting of alternative explanations for a relationship found when a retrospective design has been employed. In a quasi-experimental design, a researcher can discount alternative explanations for a relationship by using a control group, an experimental group and employing random assignment. The absence of these characteristics, in a retrospective design, means that a number of potentially confounding factors may exist (Bryman and Cramer 2005).

The Ordinary Least Squares Regression (OLS) method is used. This is the simplest and most common of regression methods. By using multiple regressions we can establish the relative importance of independent variables on the dependent variable. The regression model uses several independent variables from the patient record. Because the dependent variable, average length of stay, is skewed and not normally distributed, a logarithm of (ALOS) was used. The equation below is the model used for the analysis:

$$\log (EI) = a + b_1O + b_2T + b_3A + b_4D$$

log = logarithm of EI.
EI = Efficiency Indicator
O = Ownership (Private = 0, Public = 1)
T = Type of Facility (Treatment Centre = 0, Hospital = 1)
A = Age
D = Deprivation

The Efficiency Indicator ('EI') is the ALOS in hours/days (measured from time of admission to the time of discharge) and this is used as a measure of performance. As discussed in section 3.2.4, there are limitations to the use of ALOS as a measure of efficiency but, in general, ALOS is a readily available measure that can be used to

compare efficiencies in procedures that may be conducted by different types of provider.

The independent variable 'O' is used to differentiate provider ownership. Ownership ('O') is defined as public (NHS) or private (Independent Sector). There are certain cases where public and private are mixed. For example, BUPA Redwoods is a private facility that uses NHS physician staff. BUPA Redwoods is classified as private. The Nuffield hospitals have been classified as private unless they are classified as Nuffield NHS hospitals, where they are then classified as public.

The independent variable 'T' differentiates treatment centre and hospital. The goal of this independent variable is to control for performance based on whether care is provided by a treatment centre or hospital, and whether we see significance in efficiency differences between a facility with a focused approach and one that provides general services.

We have also assessed potential differences in age and deprivation, with a view that these may point to differences in case mix. The independent variable 'A' differentiates age groupings. As discussed in section 3.2.4, this variable consists of 20 different five-year bands. The independent variable 'D' differentiates between deprivation levels. As discussed in section 3.2.4, this variable takes values between 1 and 5, with 1 the least deprived and 5 the most deprived. There is a category 6, which is unknown. This is taken out of the analysis. The goal of using age and deprivation levels as independent variables was to control for differences in age and deprivation, which may account for above average care requirements or increased difficulty in arranging timely discharge (e.g. higher ALOS).

3.3 Research Methodology: Qualitative

The quantitative analysis simply tells us something about correlation, not causation. Also, a key weakness with a purely focused quantitative analysis approach is that a number of the ISTCs are just coming on line and are therefore not fully operational. Furthermore, often the NHS TCs are not seen as independent units, and as a result, are incorporated operationally and statistically into the entire Trust Hospital. Therefore, there is a danger that the quantitative data by itself may not permit meaningful conclusions. For that reason it is necessary to assess the evidence more deeply.

Therefore the quantitative analysis is complemented by a supporting qualitative analysis. Adamson (2005) uses the term 'complementarity,' with the general goal being that the strengths of one method is used to enhance the other. The qualitative approach relies on multiple sources of evidence to 'triangulate' research questions (Yin 1994; Adamson 2005); these sources include a review of relevant literature, documentary analysis, and primary sources of data such as interviews with Department of Health and private sector operators. The use of a qualitative approach to support evidence and conclusions made from the quantitative approach minimises threats to internal validity and external validity (Campbell and Stanley 1963; Cook and Campbell 1979), ensures generalisability (O'Rourke 2005) and, ultimately, helps draw out meaningful conclusions.

This approach is not solely limited to confirming the relationships suggested by quantitative analysis, but is also intended to shed light on the relationships in the provision of care within treatment centres. A case study approach is appropriate here, to understand not only whether ownership in fact matters, but also, if it does, how and why it does - specifically if the ISTCs exhibit higher efficiency and quality, how and why they do so.

3.3.1 Comparative Case Study Design

The comparative case study design has been chosen as the primary approach for qualitative research (Ragin 1987; Ragin and Becker 1992; Robson 1993; Stake 1994; Yin 1994). The case study approach is an *"empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence"* (Robson 1993). George and Bennett (2005) define this approach as the comparative method or 'within-case analysis.' Typically, the case study method is used as an initial exploratory inquiry prior to embarking upon quantitative research (Robson 1993). However, another role of the case study methodology is to provide a confirmatory role (Robson 1993) and this is the purpose for which the case study methodology is used in this research, as quantitative analysis suggests a strong relationship between efficiency and the ownership variable. Yin (1994) argues that case studies are generally the preferred research approach when the research questions are of a 'how' and 'why' type and address real-life set of events, which the researcher has 'no control,' and confirm suggested relationships.

Stake (1994) identifies three distinct categories of the case method study: the intrinsic case study is to learn more about a particular case; the instrumental case study provides insight into a particular issue; and the collective case study, in which instrumental study is extended to several cases in a collection of individual cases which may or may not be known in advance. The qualitative comparative case study approach was decided on as a follow up method of assessing the quantitative evidence and in recognition of the limitations in further conducting detailed analysis of the quantitative data. In this research, the instrumental study and collective case study are emphasised. The instrumental study is important with the particular issue being the Treatment Centre Programme with an emphasis on how ownership matters in performance. The collective case study allows for a cross comparison between differing Treatment Centres: ISTCs and NHS TCs. The specific cases were not known in advance, but it was known that they would be a portion of the total number of ISTCs and NHS TCs that were operational.

3.3.2 Existing Case Study Methodologies

The researcher's initial interviews were conducted with a consultant of the NHS Elect during two-day site visits and this allowed the researcher to narrow the scope of questions that were essential in subsequent site visits and interviews. These initial site visits included NHS Trust Hospitals. Though the principal focus of this qualitative analysis was to assess the evidence for differences found between IS and NHS Treatment Centres, these initial interviews allowed for comparison between NHS Trust Hospitals and NHS Treatment Centres.

In conducting qualitative research on treatment centres the research was guided by and benefited from the NHS Elect, the NHS Elect blue print, the NHS Elect treatment centre evaluations as well as an Australian group that provided a valuable third country view outside of the US and UK of how a treatment centre should be operated. These are discussed in more detail in the following paragraphs.

NHS Elect: Background

The work of the NHS Elect played an important role in identifying NHS TCs, and formulating site visits and evaluation methodology. NHS Elect was founded by Professor Ara Darzi (now Lord Darzi) and four NHS Chief Executives in 2003 to support the transformation of elective care delivery.

Early on, the NHS Elect's members were NHS treatment centres and day surgery facilities. However, the network has grown and evolved each year to meet its members' changing needs although the aim has remained the same: the transformation of service delivery and commissioning.

The most recent evolution of the NHS Elect's responsibilities is via the service level agreement with the Department of Health's 18 Week programme to help put the UK government policy of meeting 18 week waiting list targets into practice. The 18 week waiting list is a result of the NHS Improvement Plan, which set out with the goal that, by 2008, no one will wait longer than 18 weeks from GP referral to hospital treatment (Reid 2004). As a result of this stated policy, the NHS set out to create an implementation framework to realise this goal. This framework, or pathway, set out a high-level implementation plan and timetable to achieve the 18 week goal, clarifying the different contributions required of all those involved on converting to day case, improving discharge processes, preoperative assessment and getting theatre efficiency right (Reid 2004).

As a result of this service level agreement, the NHS Elect has broadened its responsibilities to assisting NHS organisations achieve the 18 week elective surgery targets. Because of this broadening of responsibilities, NHS Elect's clients now include all types of NHS Service Providers, as well as Primary Care Trust Commissioners. Today, NHS Elect's primary focus is working with its members to respond to their needs in implementing 18 week pathways and in improving services for patients in view of other related policy imperatives like patient choice and plurality.

NHS Elect: Blue Print

Today, the NHS Elect's work is to provide NHS service providers and commissioners with an overview of specific performance indicators and to help them understand where they stand in the entire 18 week pathway. If requested by the service provider or commissioner, the NHS Elect conducts an evaluation along specific segments of the pathway. Common pathways link clinical best practice, benchmarking, audits, primary care commissioning with the aim of supporting GPs, commissioners and trusts in delivering care pathways that demonstrate high quality and value for money.

These evaluations were conducted as part of the NHS's plan to create a draft 'blue print' of a single 'model of care' that could be implemented across all NHS Elect member TCs. The theory was the NHS Elect members would benefit by sharing common approaches and protocols, as far as possible. The final blueprint, when refined and finalised, would form the basis of the model of care to be implemented in each NHS Elect treatment centre. These treatment centre teams and NHS Elect members will then be 'performance managed' by the Elect Board on their progress in implementing this model of care, with any variation in practice explained and approved by the Board (NHS Elect 2007).

This blue print was based upon an evaluation by a US team that was invited to visit a number of the treatment centres and provide recommendations. These recommendations were based upon specific evaluation components which included: the management team and medical leadership; scheduling and pre-operative preparation; anaesthesia service; surgical service, recovery and post-operative care; and follow-up and rehabilitation (NHS Elect 2007).

NHS Elect: Treatment Centre Evaluations

Also important for guiding the researcher's qualitative methodology were individual assessments of treatment centres. In addition to the general evaluation, the NHS Elect conducted evaluations, or assessments, of individual NHS Treatment Centres. These evaluations were based upon the requests of the respective Treatment Centres, which had recognised that they were not hitting their performance targets. The evaluations would help identify specific areas within the Treatment Centres that could be improved upon. Here we go into this in some detail because it directly led to forming our own interviews and resultant analyses.

The general evaluation assessed aspects that were specific to individual treatment centres. First, a general overview of the facility would be conducted. This would include the number of beds, operating theatres, endoscopy rooms, and treatment rooms there were, as well as the case mix and average length of stay. The consultant would then evaluate the scheduling of the treatment centre. They would examine how the patients were referred to the treatment centre, when the consultants first would see the patient, which procedures were done as day cases, which procedures were done as overnight, one-day inpatients and any specific exclusion criteria that the facility might have had (Douthwaite 2007). The evaluations developed by these consultants made

explicit the qualitative factors which affect provider performance and greatly guided the researcher's own evaluation of reasons for variance in performance between providers.

The general evaluation would be followed by a pre-operative assessment, as this determines whether appropriate patients are being selected and admitted to the treatment centre. Non-appropriate patients could not only reduce operational efficiency, but also increase clinical risk and thus overall quality. This assessment would include how, when, and by whom pre-operative assessment was done, if it was done at all. The pre-operative process would be thoroughly evaluated, noting what types of tests were ordered and whether there were specific exclusion criteria. MRSA screening was an important question and if it was conducted, the evaluation would ask how many MRSA prone patients were identified (Douthwaite 2007). It was important to see whether the treatment centre had a nurse-led pre-assessment process and whether the entire staff was all working off the same pre-assessment. The research found that in a number of treatment centres, different doctors had their own pre-assessment evaluation form. This fostered extreme inefficiency, since each patient pre-assessment had to be matched to the physician planning to perform the procedure. It was also recommended that the Anaesthesia Department at each treatment centre comes up with guidelines that the nurses can use for their preoperative assessments, as well as for any preoperative testing that is needed. These guidelines need to be forwarded by the medical director at the treatment centre and accepted by all anaesthesia staff members so there are no delays or cancellations on the day of surgery. The use of a telephone pre-assessment programme for the day surgery patients was also reviewed. Under such programs, all patients are not brought in for pre-assessment. This is important, as it lightens the load on the staff, potentially reducing the number of staff required (NHS Elect 2007).

For out of area work, occupational therapists also need to be selective about potential patients that are going to have surgery in TCs. If too many social issues are identified during the phone assessment, the patient should be referred back to the host trust (Douthwaite 2007; NHS Elect 2007).

The evaluation also noted that during pre-assessment patients should be informed of their expected length of stay. This sets patient expectations and gets the patients thinking and planning for post TC care. Time and time again patients at NHS Trust Hospitals cannot be discharged from the facility because family and friends are not

readily available for after discharge care; there were even instances of family and friends planning holidays around this time. For the orthopaedic centres, total joint patients should have assistance at home arranged before the day of surgery. This ensures discharge in an appropriate length of time. Furthermore, lack of appropriate post discharge care is one of the most common reasons for readmissions. Patients were found not to be ensuring appropriate wound care, leading to infection, or lacking in physiotherapy (NHS Elect 2007).

The day of surgery would then be assessed. Patient's arrival time was an important indicator of operational flows and 'did not attend rates' (DNA). Key questions included whether patients arrived the night before, or the morning of, whether in groups or individually staggered, and when the anaesthetist first saw the patient (Douthwaite 2007). The NHS Elect TCs recommend that patients be prepared for surgery before admission to the theatre complex. Specifically, patients should all be cannulated before going to theatre, with the nurses on the ward or in theatre undertaking this task (NHS Elect 2007).

The patient surgery was the next important aspect of the treatment centre. How anaesthetic rooms were used would be assessed. The use of anaesthesia would be noted, as the type and how much regional anaesthesia is used are important factors in recovery time. Whether patients walk to theatre is also very important. Besides eliminating the need to wait for a porter, lessening the chance of delays, having the patient walk to surgery also sets up the psychologically important idea that the patient is in charge. The average turnover time would also be assessed. Most of the NHS facilities had this information, but this data is not reported outside of the hospital (Douthwaite 2007; NHS Elect 2007).

The treatment centre model requires strong surgical as well as anaesthetic leadership, and the leadership dynamic would also be assessed. Anaesthetic leadership can be more difficult to achieve, as surgeons may operate on a number of sites and are often a less permanent presence within a treatment centre than an anaesthetist might be. Furthermore, each treatment centre needs to ensure they have an experienced theatre nurse to manage the theatre complex. As part of this work, the nurse needs to be aggressive in the daily case management. The nurse manager must be cognizant that the treatment centre is different from a hospital in the sense that the operating theatre schedule must be based upon a system where surgical procedures are

scheduled by time rather than by a certain number of cases in a session (Douthwaite 2007; NHS Elect 2007).

Following completion of the surgical procedure, in the operating theatre, the patient is either in the post anaesthesia care unit (PACU) or moves directly into recovery. This is dependent on the surgical procedure and the type of anaesthesia given. The consultant assessed how long patients were kept in PACU or recovery, what the discharge criteria were and whether discharge procedure was nurse led. Traditionally consultants made the decision on recovery. However, if this was the case, consultants usually only came by in the evening, rather than continuously throughout the day (Douthwaite 2007; NHS Elect 2007).

Also assessed was the use of protocols. All the TCs should be moving towards a position where the most common procedures are all covered by protocol and where these protocols are common across the TCs. The most common procedure areas should all have protocols in place, including hernias, varicose veins, cataracts, knee and hip replacements, tonsillectomies (children and adults), arthroscopies, laparoscopic cholesytectomies, and anterior cruciate ligament (ACL) tears. All protocols should include details of expected recovery time, to avoid causing any block to rapid throughput. Average lengths of stay should be tracked and the recovery team should be constantly looking for ways to improve throughput (Douthwaite 2007; NHS Elect 2007).

Following discharge, follow up is essential. Evaluations also ascertained whether post operative (post op) phone calls were done, and whether protocols were benchmarked with similar UK NHS and private facilities.

Austin Health Surgery Centre: Treatment Centre Evaluations

In conducting case studies, the researcher was also guided by an evaluation conducted by Australian Group, Austin Health Surgery Centre development group. The NHS blueprint and evaluation methodology is similar to the lines of evaluations conducted by this Australian Group (McDonald and O'Leary 2008), which provided additional support from a third country for how treatment centre evaluation are conducted.

Austin Health Surgery Centre development group report details each site visited and rates each site against a set of predetermined criteria, in order to provide key lessons and applications for future surgery centre development in Australia. The

Australian evaluations were more focused, however, on gaining insight into both the daily operational challenges and provision of service, including protocols, procedures and staffing. The criteria used to evaluate each site included whether the site was welcoming, how much certainty and comfort the treatment centre provides to patients and the staff, and the staff's approach and relations. The Australian Group's assessment was based more on quality as defined by the patient and staff experience.

The Austin Health Surgery Centre development group felt that the main strength of the surgery centre was the fact that it could provide the vital separation of elective and emergency demand and create a standalone facility. To be successful, the group thought that there should be incentive based funding for the volume of work completed and flexibility in sessional allocation to ensure the efficiency and effective capacity management necessary to meet demand (McDonald and O'Leary 2008).

Their research method of the Australian group is broadly consistent with the methodology chosen in this dissertation. The Australians visited two local sites to test the visit methodology and evaluation criteria. This was found to be an extremely valuable experience and enabled them us to test the questioning, how much they could achieve within given time frames, how the evaluation criteria could be applied and how they could best use their experience to inform their questioning. These site visits helped the group learn the following key lessons: develop key areas for exploration and questions first; create a template with questions and themes to record findings; allow approximately two hours for each site visit; ensure a tour is included in the site visit (McDonald and O'Leary 2008).

3.3.3 Qualitative Research Methodology

There are many forms of data collection in qualitative research. Qualitative data collection methods can include: in-depth structured or unstructured interviews; focus groups or group discussions; participant and non-participant observation studies; and analysis of documents and materials such as reports, diaries, letters and film or television (Robson 1993; Carter and Henderson 2005). The methods of qualitative research are particularly useful for exploring more fully any insights generated by quantitative methods (Carter and Henderson 2005).

The case study research in this dissertation was conducted via interviews with a number of ISTCs, NHS TCs and NHS Trust Hospitals. The researcher chose the interview format to allow for asking both closed-ended questions as well as open-

ended questions. As a general interview tactic, questions should be simple, meanings should be clear and biases avoided. These questions were also piloted, with the initial site visits and interviews with the NHS Elect consultant, to allow for narrowing the focus of the research questions. Closed-ended questions were asked for specific quantifiable questions (e.g. staffing numbers), where as open-ended questions were used when asking about more political sensitive issues (e.g. perception of management control over consultants) (Bowling 2005).

Additional sources of evidence used to support the interview research methodology include official and non-official publications from the Government, press material and media broadcasting, as well as interviews with key decision-makers and policy-makers. These interviews include members of the NHS Elect (2 interviews), Commercial Directorate (4 interviews) and the Department of Health (1 interview).

Method of Selection of Case Studies

The selection of the case studies was based upon two criteria. First, an ISTC from each of the major groups, or chains, owning and operating the treatment centres in England, were to be interviewed. Second, due to the broad variety of NHS TCs that were in operation, both stand-alone and NHS Trust Hospital integrated treatment centres were to be selected.

The selection of different providers allowed for a broad geographical spread throughout all of England, in the North and South of the country and included facilities located in urban as well as rural areas. The interviews and site visits included facilities that were day case and inpatient within all clinical specialty areas. National data as well as research conducted by the Commercial Directorate and NHS Elect matches characteristics of those case studies chosen.

A quality assessment of the site visits was also conducted through the interviews at the Commercial Directorate and NHS Elect. This is to ensure that the findings were generalisable when all studies are included or when the individual cases are analysed separately (Cullinan 2005; O'Rourke 2005). Ragin and Becker have argued that in selecting the cases strong preconceptions are likely to hamper conceptual understanding of the evidence and that their final conclusions about the nature of the cases "*may be the most important part of the interaction between ideas and evidence*" (Ragin and Becker 1992).

In addition, interviews were conducted with the Commercial Directorate (CD) of the Department of Health, the NHS Elect, a consortium of NHS elective care providers, and managers of other facilities to provide a bigger picture of the on-going operations within treatment centres and hospitals. This was to further confirm the general findings, thus mitigating threats to validity.

Method of Data Collection: Semi-structured Interview

The method of data collection was primarily through semi-structured interviews (See Appendix B: Interview Questions – Treatment Centres and Hospitals). The interview design, was partly based on some of the basic phases of a narrative interview, with the initiation of the discussion, the main narration, the questioning phase, and finally, the concluding talk (Dexter 1970; Jovchelovitch 2000).

The schema involved the compilation of a set of questions in advance, the order of which was then modified based upon what seemed most appropriate in the context of an informed conversation (Robson 1993; Bowling 2005). After a short introduction in which the interviewees were informed in more general terms about the main subject of this research, the interviewees were all asked the same initial questions about the Treatment Centre Programme with respect to their facility.

Site visits and interviews were held in 2007 and 2008. The initial interviews were conducted with a consultant of the NHS Elect during two day site visits. This allowed the researcher to narrow the scope of questions that were essential to this topic for subsequent site visits and interviews. These initial site visits included NHS Trust Hospitals. Though the scope of this qualitative analysis is to assess the evidence for differences found between IS and NHS Treatment Centres, these initial interviews allowed for comparing NHS Trust Hospitals and NHS Treatment Centres.

A systematic approach was followed, though the interviews were semi-structured. The researcher worked out a questionnaire in advance, but modified the order based upon the context of the conversation. This technique was used to allow for a less formal approach, allowing the interviewee, and others individuals that were encountered during the tour, to speak freely (Robson 1993). The initial interviews were two full day interviews with management and clinical staff. The follow on site visits could last anywhere from 90 minutes to a one-half day. Typically, the site visit would commence with the interview questionnaire, which would on average last 60 minutes followed by a walk through the facility. On a number of occasions, the

facility walk through was conducted during the interview to allow for a better understanding on how the facility was organised and operated.

The primary interviewees were typically the facility manager or the nurse manager. Typically, in the ISTCs, the primary interviewees were the general manager and the finance director or chief medical officer. During the NHS TC site visits the primary interviews were with the nurse managers.

The facility walk through allowed for meeting with both operational and clinical staff as well as senior managers and directors. The variety of staff involved in the visits provided information on challenges and successes from multiple levels within each organisation. Nursing staff talked of equipment and patient issues, whilst managers and directors were able to describe the funding models and efficient systems and processes crucial to their success.

The number of additional interviews varied as this depended on the facility size as well as availability of staff. This approach of using the walk through for conducting additional interviews allowed for repeating the interview questions and attempting to explore deeper on previous responses provided. The interview would conclude with the primary interviewee and follow up with questions not yet answered.

Many of the questions are deemed to be quite sensitive. Over the past few years, there has been much scrutiny placed upon the provisioning of health care within the NHS, both political and from the media, such as the BBC documentary, 'Can Jerry Robinson fix the NHS (Lambert 2007)?' There also appears to be high scrutiny placed on the independent sector (especially the ISTCs) as well as the NHS (Royal College of Physicians 2003; British Medical Association 2005; Health Committee 2006).

Therefore, within this politically sensitive environment, the semi-structured approach was deemed the most appropriate method of interviewing. A varied question order allowed for capitalising on the responses made by allowing for the most relevant follow-up question to be asked. As a matter of tactic, this approach would allow for greater freedom in the sequencing of questions, in their exact wording and in the amount of time and attention dedicated to different parts of the interview (Robson 1993). Missed topics would be returned to at a later stage, such as in the closing discussion. Sometimes the more difficult and sensitive questions, especially on consultant and management relationships, would be asked at this time, if they had not been yet discussed. Further, because the researcher is a non-clinician, outstanding clinical questions were cross checked with experienced medical personnel. Because of

the sensitivity of the topic, it was determined best to not tape-record the interviews. However, notes can be supplied upon request.

3.3.4 Qualitative Case Studies

Site visits and interviews were conducted with seven (7) ISTCs and nine (9) NHS TCs. This amounted to approximately one-third of the ISTCs that were fully operational in England at the time and one-quarter of the NHS TCs. Two (2) NHS Trust Hospitals were also visited in the process to differentiate NHS TCs from NHS Trust Hospitals and thus provide a fuller picture. In total, 18 site visits were conducted in different treatment centres and hospitals (see table below). The following paragraphs provide an overview of each facility visited and interviewed.

Table 3.4 Interview Sites

ISTC	NHS TC	NHS Trust Hospital
Shepton Mallet ISTC	Royal Hampshire NHS TC	Royal Hampshire NHS Trust Hospital
Interhealth Canada Chesire and Merseyside ISTC	Ravenscourt	Royal Marsden
Medway Mercury Health	ACAD	
Bodmin NHS Treatment Centre	Brunel Treatment Centre (Swindon)	
Greater Manchester ISTC*	Hinchingbrooke	
Peninsula ISTC	Lewisham	
Kidderminster ISTC	Kidderminster	
	Weston-super-Mare	
	Chichester	

* Interviewed in London office. Site visit not conducted.

Shepton Mallet NHS Treatment Centre is a stand-alone facility located in Somerset operated and managed by UK Specialists Hospitals. The facility opened in July 2005 as a purpose built 34-bed facility providing inpatient, outpatient and diagnostic services. Clinical services include orthopaedics, ophthalmology, general surgery and endoscopy as well as imaging and diagnostics. The facility has its own self-contained diagnostic unit.

The Cheshire and Merseyside NHS Treatment Centre is a stand-alone facility operated and managed by Interhealth Canada. The facility opened in June 2006 as a purpose built 44-bed orthopaedic facility, which includes four operating theatres and

diagnostic and outpatient services. The facility has its own self-contained diagnostic unit.

The Medway Mercury Health ISTC, as known also the Will Adams NHS Treatment Centre is a stand-alone facility located in Gillingham owned by Mercury Health, but at the time operated by a US company, Health Inventures. The facility opened in October 2005 as a purpose built facility providing day-surgery procedures and related out-patient appointments for patients within the Medway and Swale PCTs. The surgical specialties include urology, gynaecology, general surgery, gastroenterology and orthopaedic services. The facility has its own self-contained diagnostic unit.

The Bodmin NHS Treatment Centre is a stand alone purpose built facility designed to provide diagnosis and treatment of conditions on a day case basis. The facility opened in January 2006. The centre is on the site of the Bodmin NHS Trust Hospital. The treatment centre provides general surgery including endoscopy and colonoscopy, ophthalmology including cataracts and gynaecological procedures. The facility has its own self-contained diagnostic unit.

Netcare's NHS Treatment Centre, the Greater Manchester Surgical Centre, is a stand alone newly built 48-bed facility. The facility opened in 2005. Greater Manchester provides inpatient and outpatient services. The facility primarily emphasises ear, nose and throat surgery, and orthopaedic surgery. The facility has three operating theatres, a rehabilitation department and its own self-contained diagnostic unit.

The Peninsula NHS Treatment Centre is a stand-alone purpose-built surgical facility serving the populations of Devon and Cornwall. The Peninsula NHS Treatment Centre is owned and operated by Care UK. The Peninsula NHS Treatment Centre opened in April 2005 and provides inpatient and outpatient orthopaedic services. The facility has two operating theatres, 28 beds, and a small critical care unit. Diagnostic imaging support to the centre is provided at the facility by another private company, Alliance Medical.

The Kidderminster Treatment Centre is situated within the Kidderminster Hospital. Kidderminster ISTC provides inpatient and outpatient orthopaedic services as well as diagnostic services. The Treatment Centre is a unique model as it is situated within the Kidderminster Hospital and adjacent to the Kidderminster NHS TC. The ISTC leases one operating theatre from the Trust and all pre-operative and post-

operative care is provided by Kidderminster NHS TC, a separately run facility. The diagnostic are outsourced to the Trust under contract.

The Kidderminster site was a full service general hospital. The recent history of the facility is quite interesting to note, as this has determined the unique relationship of the Kidderminster ISTC and NHS TC. The hospital was due to close, but a local physician ran on a single issue campaign to keep the facility open. As a result, the Kidderminster site has become a unique NHS facility. The Kidderminster site has a minor injuries unit, a primary care centre, an oral, facial and orthodontics clinic, dialysis services, an NHS TC as well as the above mentioned ISTC. The Kidderminster NHS TC provides cardio-pulmonary services, urology and orthopaedic services. The facility has three operating theatres and has some diagnostic services. MRI services are provided by the Trust Hospital at a different location.

The Winchester NHS Treatment Centre is located within the Royal Hampshire County Hospital in Winchester. The treatment centre is located within a wing of the Trust Hospital and opened in November 2005. Though the wing is purpose built, it is physically part of the old hospital. The facility has three pre-assessment rooms, three operating theatres, four endoscopy suites and a 28 beds inpatient unit designed for up to 23-hour stays. Diagnostic services are shared with the Trust Hospital. The site visit was conducted over two days to both the treatment centre as well as the Trust Hospital.

Ravenscourt Park NHS Treatment Centre was part of Hammersmith NHS Hospitals Trust. It was a stand-alone NHS specialist centre for hip and knee operations situated within an old art-deco style building. Aside from Kidderminster, it was the only site visited not situated within a NHS Trust Hospital site. Diagnostic services were a self-contained unit with the treatment centre. The facility is now closed as it was incurring losses and the referrals were insufficient to justify its on-going operations.

The Ambulatory Care and Diagnostic Centre (ACAD) at Central Middlesex Hospital, is part of the North West London Hospitals NHS Trust. The Treatment Centre opened in 1999 was the first treatment centre in England dedicated to elective procedures (Health Committee 2006). ACAD provides the full range of elective day-care and inpatient care services as well as emergency inpatient services. Diagnostic services are a self-contained unit with the TC.

The Brunel Treatment Centre is part of the Great Western Hospital in Swindon. The centre opened in October 2005 as a new wing connected to the main Hospital. The treatment centre has five main operating theatres, two minor operating theatres and 23 inpatient beds. The treatment centre uses the diagnostic facilities available in the Great Western Hospital.

Hinchingbrooke NHS TC is part of Hinchingbrooke Healthcare NHS Trust. The new facility opened in November 2005 and is situated adjacent to the Trust Hospital. Clinical services include gynaecology, gastroenterology, vascular, ENT, orthopaedics and ophthalmology. Diagnostic services are a self-contained unit with the TC.

Lewisham Treatment Centre is situated alongside the Lewisham NHS Trust Hospital. The wing was built in 2007. The architectural planning is a combination of various plans over the years as the facility was intend first for day case procedures. Later, the orthopaedics were added and then endoscopy. Today, clinical services include general surgery, vascular, ENT, gynaecology, trauma and orthopaedic surgery. The Treatment Centre does not have inpatient beds but mixes patients within the treatment centre from the hospital. The treatment centre uses the diagnostic facilities available within the main hospital.

Weston-super-Mare Treatment Centre is situated on the second floor of the Weston General Hospital. The wing was built in 2002. The Weston-super-Mare Treatment Centre is unique as it is built as a dedicated day case unit within the hospital. The Treatment Centre is clearly different than other NHS TCs. Rather than focus on a core set of treatment centre procedures, they do nearly all types but only day case procedures. Clinical services include ENT, oral surgery, urology, gynaecology, general surgery, orthopaedic surgery, pain management, biopsies and bronchoscopies. The hospital even accepts pre-op and post-op patients that are day case but will be operated on in the main theatre. The treatment centre uses the diagnostic facilities available within the main hospital.

Chichester NHS TC, part of St. Richard's NHS Trust Hospital, opened in March 2006. The hospital is situated adjacent to the main hospital. The Chichester NHS TC facility includes four operating theatres, four endoscopy rooms, an angiography suite, a 22-bed ward with four en suite rooms for 23-hour stay, pre-operative assessment and outpatient facilities. The facility also has a cardiac catheterisation laboratory, where special diagnostic x-rays of the heart are carried out. The treatment centre uses the diagnostic facilities available within the main hospital.

The Royal Marsden Hospital is an NHS Foundation Trust Hospital dedicated to cancer treatment and research. The Trust provides inpatient, day care and outpatient services for all areas of cancer treatment. In April 2004, the hospital became one of the country's first NHS Foundation Trusts. This new status has provided the financial freedom and greater flexibility to focus on allowing more patients to access the facility's expertise. In 2007, the Royal Marsden was awarded the highest score of 'excellent' by the Healthcare Commission, for both quality of services and use of resources for the second year running - the only NHS trust to do this. The Royal Marsden asked the NHS Elect to conduct an evaluation of their day case centre. Though the hospital is outside of the NHS Treatment Centre programme, the opportunity provided an additional case study from one of the best hospitals clinically, operationally and financially in the UK.

3.3.5 Qualitative Data

A matrix was put together to facilitate comparison of the responses vis-à-vis facility type and to help assess relationships between the different facility types (See Chapter 5 in Annex A). Certain question areas allow for grouping between these facility types, and for drawing inferences (cross-case comparison) (George and Bennett 2005). This led to further exploratory work in the follow up interviews. The researcher found that more complete inferences could be drawn from the qualitative analysis chapters. These inferences will be discussed in the Conclusions and Policy Analysis Chapter (Chapter 7).

The use of a qualitative data analysis tool (e.g. NVivo) to assist in the analysing of the qualitative data was assessed. However, the use of a software package was determined as inappropriate with respect to the cross-cultural nature of this research. The researcher felt that the qualitative data analysis tool would not have captured the entire range of cross-cultural attitudes driving question responses; nor would it have allowed the researcher to depart from the interview questions when additional information was needed to flesh out a response to the respective subject matter as responses to questions often were not of a binary (Yes/No) nature. The researcher felt that the more optimal approach chosen by the researcher would allow for departing from a rigid program of interview questions to press subjects for clarification and elaboration as the evidence is much more complex and demands interpretation. This

interpretation is set out in the case study interview matrix (See Chapter 5 in Annex A).

3.3.6 Other Qualitative Data Sources

To provide support to the qualitative and quantitative analysis, the researcher additionally drew on information collected from the following sources:

- Official publications. These included government white papers, consultation papers, annual reports, policy statements and press releases (Commercial Directorate 2005; Department of Health 2005; Utley and Gallivan 2005; Health Committee 2006; Delivery of the 18 week patient pathway 2007; Healthcare Commission 2007) .
- Other documents. These included reports and press releases from interest groups, and hospital board meetings, interim reports and policy proposals as well as ministerial communications, such as from within the Department of Health, the respective Treatment Centres, NHS Elect, which may or may not have been published (Audit Commission 2000; Dexter and Traub 2002; Anastasiou 2005; Dexter, Ledolter et al. 2005; Anderson 2006; Bannister 2006; Douthwaite 2007; Moss and McCarthy 2007; CBI 2008).
- Press material and media broadcasting. These included newspaper articles and other media reports (Carvel and Tomlinson 2005; Timmins 2005; Timmins 2007).
- Interviews with key decision-makers and stakeholders. This included interviews at the Department of Health, Commercial Directorate and the treatment centre providers (Longhi 2005; Anderson 2007; Douthwaite 2007; Parker 2008).

3.4 Key Limitations

This section examines some of the limitations of the methodologies employed.

3.4.1 Quantitative Methodology and Data

First, there are obvious limitations posed by using ALOS as a proxy for performance. However, as discussed, other methods of performance measurement are not reported to a central NHS database that might allow for comparison between the four groups. As result, ALOS has been determined to be the best indicator to broadly

assess differences in performance, while keeping in mind the above mentioned limitations. However, ALOS is very highly positively skewed and there are significant outliers, or extreme values, in the dependent variable that can exert an excessive influence on the results. Some may argue that using median and inter-quartile range data may be better statistical measures to use. The median and inter-quartile range is cross-checked with the evidence with detailed analysis provided in the relevant appendices.

Another potential limitation to the findings is that the difference in means analysis between individual HRG comparisons does not account for the number of cases within each provider comparison. For example, in a comparison between a private hospital with a low number of cases with a lower than expected ALOS and a NHS Trust Hospital with a high number of cases, the outcomes may be biased.

Furthermore, the lack of comprehensive set performance metrics means that the data do not provide a complete performance picture in terms of efficiency and quality. It also means that there are gaps and inconsistencies between providers with respect to the data.

Another problem is ISTC and NHS central data systems are not currently able to provide robust data. For example, ISTCs are not reporting consistently into the NHS central database, some ISTCs have not reported data accurately for some KPIs, NHS TCs are not reporting into the NHS database and NHS Trusts are having problems separating out their data from the treatment centre and the Main Hospital (Health Committee 2006; Healthcare Commission 2007; Mason, Miraldo et al. 2007; Pollock and Godden 2008; The Information Centre 2008).

This last point is of great interest and significantly underestimated so far in the general research. Currently, there are over 60 NHS TCs, but in any given case a maximum of 7 NHS TCs are shown to be reporting. Clearly, the majority of NHS Trust Hospitals do not separate out the Trust Hospital discharges vis-à-vis the NHS TC data. Because the NHS TC data is embedded within the overall Trust data, the evidence suggests that by separating out the current reported data, NHS Trust Hospital performance could be even lower than the evidence suggests.

In view of these limitations, a data request was made directly to more than a dozen NHS TCs. Only one response was attained. In a similar study, the National Audit Office (NAO) received some data from the NHS TCs, which the researcher obtained

for use. However, this data was virtually unusable as there was no complete set of data for comparison between providers, HRG discharges and average length of stay.

Another important limitation is that the HRGs have not been linked to financial remuneration for the majority of providers assessed. The only providers which have a direct linkage between HRG reporting and reimbursement would be the NHS Trusts under Foundation Status. The ISTCs themselves are paid under take-or-pay contracts. Therefore, aside from the Foundation Trust Hospitals, there is little financial incentive to report data accurately. In reality, reporting the data accurately is a cost, as it takes more time, and there is no financial remuneration for better data reporting.

Another weakness of the HRG methodology at its current status is that the groupings are not refined enough to account for variations in complexity in the individual patients and the total case mix of the respective facilities. As discussed in Section 3.2.3, there is evidence that case mix is an important determinant of inter-hospital variation in average cost, utilization of ancillary services and mean length of stay (Feldstein 1967; Evans 1971; Evans and Walker 1972; Feldstein and Schuttinga 1977). Unfortunately, an agreed case mix method of adjustment has not been developed in the UK. Case mix complexity in this chapter is adjusted for by using reference costing and adding age and deprivation variables.

The indicator used for deprivation, however, also is associated with some problems. The index of multiple deprivation (IMD) is widely used as a measure of socio-economic status. IMD scores assigned to local areas were ranked from the least to most deprived fifth of the population, and, for each procedure, patients were assigned to a relevant fifth on the basis of their postcode. For most procedures, NHS acute trusts had the highest proportions of patients in the most deprived fifth of the population, higher than in both ISTCs and NHS TCs. This may reflect: the catchment populations of the local areas where ISTCs and NHS treatment centres have been sited; inequity of access to ISTCs and NHS treatment centres for patients from deprived areas; that patients from deprived areas are likely to have more complex health needs which make them unsuitable for referral to treatment centres; or some combination of these factors. This could have a negative impact in terms of race equality, as higher proportions of people from minority ethnic groups live in deprived areas. More generally, this pattern in the provision of services indicates the need for further investigation in the context of the Department of Health's goals of, and policies for, reducing inequalities in health and access to health care.

Finally, findings are based on point in time analysis; they therefore do not capture prospective performance of these new treatment centre. These are in fact start-up businesses which take years to build up. Furthermore, these facilities are not receiving the expected referrals, with many operating at below 50% occupancy. Therefore, there is little incentive from the volume side to discharge patients quickly, though these facilities are still showing a lower ALOS.

Validity is concerned with whether the findings are really about what they appear to be about. In recursive studies there is always the risk that apparently causal relationships could, in fact be caused by a third, unknown factor. Poor data could exacerbate this problem and, in addition to the reasons detailed in Section 3.4.1, the data could be unreliable for other reasons. One is usually termed subject error. It is possible that the included cases were chosen not because they are currently operating and the omitted cases left out because they are not yet on line, but because the ones operating are the best ones and the cases not studied are poor operators. More problematic from a validity point of view are sources of subject bias. It could be that the case studies chosen, and those that were responsive to sending in the data were responsive because they knew that they were good operators.

Internal validity is concerned with the extent to which a study establishes that a factor or variable has actually caused the effect that is found. This term was introduced by Campbell and Stanley (1963), who provided an analysis of eight possible threats to internal validity. Cook and Campbell (1979) extended this analysis, providing an additional four threats. These threats are: History, Testing, Instrumentation, Regression, Mortality, Maturation, Selection, Selection by maturation interaction, Ambiguity about causal direction, Diffusion of treatments and Compensatory rivalry.

There are two primary strategies for dealing with these threats in the design. The first strategy is to understand the threat, or, conversely, knowing where a threat does not apply. This is applicable to the qualitative case studies. The second strategy is randomisation. This is applicable to the quantitative work using data from Dr. Foster

External validity, or generalisability, is the degree to which findings can be generalised from the specific sample in the study to some target population (Robson 1993). For example, a researcher needs to ask whether the findings of the enquiry can be generally applicable, in other contexts, situations or times, or to persons other than those directly involved (Robson 1993). There are four threats to external validity:

selection, setting, history, and construct effects. For example, because randomisation is not part of the empirical analysis, selection of the cases is an issue of major concern. Selecting the cases that are up and running, may create a self-selecting bias in itself. These are valid arguments and need to be responded to in the analysis.

Cause should be taken to mean that variation in the dependent variable is affected by variation in the independent variable. In order to establish a causal relationship, three criteria have to be fulfilled. First, it is necessary to establish that there is an apparent relationship between two variables. Second, the researcher must show that the relationship is non-spurious. A spurious relationship occurs when there is not a 'true' relationship between two variables that appear to be connected. Third, it is necessary to establish that the cause precedes the effect. The time order of the two related variables is important. For example, a researcher must establish that aggression is a consequence of watching televised violence and not the other way around (Bryman and Cramer 2005).

The researchers must be continuously aware of these threats to internal and external validity in quantitative data analysis to guard against faulty conclusions or potential bias. Though bias can never be completely avoided, an awareness of where bias is likely to occur and how it may influence the results, can significantly minimise the risk in the threats to validity (Robson 1993; Bowling 2005).

There is also a danger of cross-causation or simultaneity in the model. For instance, ALOS and ownership may be linked. However, the researcher feels that the correlation between ALOS (efficiency) and ownership is one directional and that it is ownership driving ALOS (efficiency), rather than ALOS driving ownership. For ALOS to affect ownership, we would expect to see facilities with an established ALOS changing ownership. However, as most treatment centre are new, ownership has tended to precede the establishment of average ALOS levels.

3.4.2 Qualitative Methodology and Data

Selection bias is also a potential limitation in the qualitative data used. While, selection bias in statistical studies typically understates the strength of the relationship between the independent and dependent variables, in case studies selection bias may overstate the relationship (George and Bennett 2005). This would mean that the selection of ISTCs is not adequately uncorrelated with performance, but rather that

only well performing ISTCs have been able to open so far. Thus selection bias may overstate the relationships found; in this case higher performance would be found.

The researcher gained access to the NHS TCs and NHS Trust Hospitals as they had asked to have their performance appraised. As a result, the NHS TCs chosen to be interviewed are likely to have been selected because of a recognised underperformance in their operational approach. In this case, it would appear that these facilities are performing more poorly. Moreover, it is possible these facilities were willing to be more open about the clinical operations in order to obtain the appropriate feedback. In the case study qualitative work, for the most part, the evidence suggests that the NHS TCs are not operating as intended. They are not selecting appropriate elective surgical patients. Bias is minimised due to the fact that the sites chosen were fairly representative of all of the NHS TCs (Douthwaite 2007). Further, the findings were found to be consistent with the work of the NHS Elect (Parker 2008).

Furthermore, the facilities chosen were facilities that were both operational and reporting to the NHS during the period January 1, 2007 to December 31, 2007. The facilities that were operational may, in fact, always have better indicators than the facilities not yet open due to their operational know-how. This selection bias would then be in effect for both the ISTCs and NHS TCs. As the NHS-run treatment centre program was launched a few years prior to the ISTCs, there may have been a smoothing effect already in place between the respective facilities. Therefore, even if there is selection bias, this would not affect the results by ownership, rather only by facility type. Undoubtedly, over time the issue of selection bias will lessen.

The enquiry also found that England's NHS was undergoing immense pressure at the time of study. The on-going changes, which may be the greatest since the inception of the NHS, undoubtedly have some effect on the findings. Further, a number of the NHS TC interviews took place during the end of the fiscal year, as the Trusts were attempting to meet wait list targets so to not be in breach. As a result, there is a cyclical aspect to the operations of NHS facilities.

Observer error is another possible source of unreliability. For example, the interviewer does not have a medical background. As a result, the discussions with anaesthetists and consultants may not have been as detailed as with someone with formal medical training. This was mitigated by the fact that a number of the site visits were conducted with an independent consultant for NHS Elect, an operations expert

in the field, and a nurse. As a result, the medical background of the co-interviewer allowed the research to pay attention to greater medical detail than if the researcher had conducted all the interviews alone. Additionally, outstanding questions were cross-checked with other medical personnel.

Observer bias is also possible, and like subject bias, causes greater problems in interpretation. For example, the manner in which the quantitative analyses were chosen could show more favourable results than other statistical methodologies (Robson 1993). Within the NHS there were clearly many issues, as it was undergoing radical transformation. Many of these issues had been discussed openly in the media. However, within the ISTCs there was less conflictual information garnered. For instance, from the interviews, a number of the NHS consultants mentioned that at the ISTCs, the provisioning was not always as good as one would expect. This could not be verified. The interviewer certainly spent less time with consultant staff within the ISTCs than within the NHS. This could be due to the fact that the ISTCs were more sensitive about information and the potential for negative information being published.

There may also be some endogeneity with respect to the use of consultants. The ISTCs were not allowed to hire consultants that had worked for the NHS within the past six months. As a result, most, if not all, of the ISTC consultants were from overseas. On the other hand, the NHS TCs used NHS consultants. As a result, some of the findings may be specific to the types of consultants that are on staff.

Finally, there is also the potential that while the NHS may underperform on some criteria; its overall social utility is compensated for by its outstanding performance on other criteria. The researcher was focused on internal efficiency, a criterion by which the independent sector is clearly performing very well. However, the NHS has a larger role to play in society. The researcher may have missed some of the bigger issues that the NHS struggles with that intervene in day-to-day operations.

3.5 Summary

This chapter explains the research design, describes in more detail the quantitative and qualitative research methodologies used and addresses some key limitations to the research. This research method appears to be best suited for the goal of analysing the potential causes and effects for variances in health service quality and efficiency using the Treatment Centre Programme as the research emphasis.

PART II

The Evidence Reviewed – Quantitative Analysis

Chapter 4: Initial Assessment of Performance: Efficiency and Quality

Chapter 4

Initial Assessment of Performance: Efficiency and Quality

The most pernicious doctrine in health services research, the greatest impediment to clear thought and successful action, is that health care is different.

Robinson, J

4.0 Introduction

This chapter will use a quantitative methodological approach, with the intention of conducting an initial assessment on the specific issue of treatment centre performance in England. The purpose of the analysis is to initiate the hypothesis that there are differences in performance between the treatment centres, not to explain causation or engage in prediction. This chapter is to support the initial hypothesis and justify the rest of the thesis through ensuring that there are differences to explain between the ISTCs and NHS TCs in terms of efficiency and quality.

Because the Treatment Centre Programme in England encompasses not only ISTCs, but also NHS Treatment Centres (NHS TCs), we have an opportunity quantitatively to assess the performance of IS and NHS Treatment Centres alongside NHS Trust Hospitals and Independent Sector General Hospital Providers and as a result uncover whether there are advantages in terms of efficiency and quality that may be associated with differing ownership structures (public or private) and facility type (treatment centre or hospital).

An initial descriptive analysis is undertaken to look at a number of basic statistical values. This is followed by pooling the mean differences between groups. Multivariate regression analyses are then undertaken in order to assess the predictive value of these mean differences, to control for potential confounding factors and to determine the significance of variables such as ownership status, treatment centre focus, age and deprivation.

This chapter is divided into five sections. Section 4.1 provides a brief review of efficiency and quality within the context of this dissertation. Section 4.2 briefly reviews

the research methodology and data used. Section 4.3 reviews the results found from the statistical analysis using the differences in means and regression analysis. Section 4.4 discusses the findings in more detail and addresses some key limitations. Section 4.5 follows with concluding remarks.

4.1 Efficiency and Quality of Outcomes: A Brief Review

The evidence will be assessed as to whether there are differences in performance between the ISTCs and NHS TCs in terms of efficiency and quality. We include data from NHS Trust Hospital Providers and Private Hospitals to draw out the evidence as to whether these differences are due to treatment centre focus or ownership. The efficiency analysis will be primarily technical in nature, rather than allocative. A technically efficient firm produces as much output as possible from a given amount of inputs, or produces a given output with the minimum possible quantity of inputs (Vickers and Yarrow 1988; Le Grand, Mays et al. 1998; Hensher 2001). Allocative efficiency is where the 'best' mix of outputs across different services areas is selected (Vickers and Yarrow 1988). Though the conclusions would be stronger if they could include allocative efficiency, a method of quantifying allocative efficiency is quite difficult to formulate. Therefore, for this analysis we will focus on technical efficiency.

The evidence will also be assessed as to whether there are differences between the ISTCs and NHS TCs in terms of quality outcomes. General economic theory would state that repetition breeds competence (Skinner 1974). In theory then, treatment centres should exhibit higher quality outcome levels than general hospitals because of their more focused approach. As a result, again, we include data from NHS Trust Hospital Providers and Private Hospitals to draw out the evidence as to whether these differences are due to treatment centre focus or ownership.

However the theory may not easily apply. Health care is a highly complex industry and even though there may be increases in quality at the unit level within a facility, these may be accompanied by decreases in quality at the level of the overall health system. Increased capacity means that volume levels are spread more thinly amongst the competing providers in a market. Therefore, when more providers compete for the same or lower volume of services, quality may decline and per-case costs may actually increase as capacity becomes not fully utilised (Robinson and Luft 1985; Herzlinger 2004; UNISON 2005). Consequently, finding the optimal level of volume of the specific procedures vis-à-vis number of competitors is difficult to balance.

Whether the change in ownership of a firm from public to private (e.g. privatisation) actually leads to an improvement in performance – measured by efficiency and quality outcomes – has been the subject of a considerable amount of theoretical and empirical research. The literature review in Chapter 2 assessed the existing research and concluded that, broadly speaking, and controlling for other factors such as the level of regulation and competition in the market, ownership does matter, in the sense that changes in the structure of property rights are likely to have significant effects on firm behaviour.

Further, general economic theory would state that there are also advantages to specialisation, in terms of efficiency and quality of output. In theory, treatment centres should exhibit higher levels of productivity and quality outcomes than general hospitals, because of their more focused approach.

4.2 Research Design and Methodology

The primary emphasis is geared to providing answers to whether there are differences in performance in terms of efficiency and quality between the ISTCs and NHS TCs. However, to draw out the evidence on differences in performance we include NHS Trust Hospital Providers as well as Private Hospitals. In total there are four categories of providers compared: ISTCs, NHS TCs, NHS Trust Hospitals and Private Hospitals. A number of PCTs also provide health service provision. These providers are incorporated into the NHS Trust Hospital category.

Table 4.1 Four Categories of Providers Compared

Facility Type / Ownership	Private	Public
Treatment Centre	ISTC	NHS TC
Hospitals	IS Hospital Providers	NHS Trust Hospital (and PCTs)

Information as to whether variations in quality and efficiency are due to ownership status (public or private), treatment centre focus (treatment centre or general hospital) or other variables are drawn out using basic descriptive statistics, followed by weighted mean difference and then multivariate regression analyses (See Chapter 3 for a more detailed description of the research methodology).

4.2.1 Data and Variables

The data used is individual patient records – defined as a Finished Consultant Episode (FCE) - of every NHS patient treated as a day case or inpatient in England between January 1, 2007 and December 31, 2007. Each patient record includes a number of data

'fields', containing demographic (e.g. age, gender) and clinical information (e.g. diagnosis, procedures performed). The patient population studied will be those patients that receive elective care within specific Health Resource Groups (HRGs – see Chapter 3). The top HRGs contracted by the Commercial Directorate (CD) are cataract surgeries, hernia repair and hip and knee procedures. In total, over 480,000 patient records have been selected for study within these HRGs (see Chapter 3 for listing of number of providers by HRG category). These top HRGs account for 10% of the total elective surgical procedures (Dr Foster 2008). These HRGs were chosen because they are the highest volume procedures within the ISTCs and NHS TCs, generating a significant number of cases for statistical analysis.

4.2.2 Descriptive Analysis

To initiate the analysis, a basic statistical analysis is conducted. We look at the number of cases in each procedure area and the mean. Where appropriate, the median, standard deviation and range are also assessed. The descriptive analysis is used to initiate the analysis prior to conducting the mean difference and regression analysis.

4.2.3 The Model: Mean Differences

As discussed in Chapter 3, an initial analysis was conducted pooling the mean differences of the HRGs. The pooled estimates are based on the weighted mean difference (WMD) statistic. The WMD, or 'difference in means', measures the absolute difference between the mean values between two groups. This method was used to see if there was a clear difference in the average length of stay (in days), age, rate of death and other variables, between different provider types for different surgery types. A 'pooled effect' is also assessed. This provides an indication of the effect size across the HRGs assessed. The pooled effect is the calculated weighted mean difference of all the comparisons between providers. The confidence interval for the weighted mean difference is also calculated for the pooled effect.

4.2.4 The Model: Regression Analysis

Multivariate regression analysis was then conducted to explore the weighting of these relationships in comparison with other potential variables. A standard ordinary least squares (OLS) regression was used, with one regression run for each HRG type. Average length of stay by HRG was regressed against ownership of the facility (public of private), the type of facility (TC or hospital), the age of patient and a proxy for the individual's

socio-economic status with the length of stay to draw out these relationships. Because average length of stay is skewed and not normally distributed, a logarithm of ALOS was used. A non-logged OLS regression was also conducted and can also be found in Appendix H.

4.3 Results

The results from the descriptive analysis and difference in means are suggestive of differences between ISTCs, NHS TCs, NHS Trust Hospitals and Private Hospitals. A regression analysis is then conducted to assess the weighting of these differences by the variables used vis-à-vis other unexpected reasons.

4.3.1 Basic Descriptive Analysis

A basic descriptive analysis was conducted for the inpatient cases assessed between ISTCs, NHS TCs, NHS Trust Hospitals and Private Hospitals. In all cases ISTCs have the lowest ALOS, followed by Private Hospitals, NHS TCs and then NHS Trust Hospitals. These differences are less when assessing the median values. This is due to the large variance and a number of significant outliers in the NHS Trust Hospital and NHS TC cases. For example, for a Primary Knee Replacement (H04), we see that a NHS Trust Hospital had an inpatient stay of 152 days and for a Primary Hip Replacement (H80), we see an ALOS of 372 days. This is unlikely due to purely coding errors as there are a number of outliers. Box plots have been drawn up and depict the large variation in ALOS by HRG by provider (See Appendix I: Box Plots).

Table 4.2 Descriptive Analysis: ISTCs, NHS TCs, NHS Trust Hospitals and Private Hospitals

HRG	Facility Type	N	Mean	Median	Std. Deviation	Range
H04	ISTC	2,076	4.75	5.00	1.740	31
	NHS-Run TC	2,160	5.83	5.00	3.594	61
	NHS Trust Hospital	46,948	7.10	6.00	5.331	152
	Private Hospital	1,132	4.90	5.00	1.944	26
	Total	52,316	6.91	6.00	5.157	152
H71	ISTC	31	6.77	5.00	4.248	19
	NHS-Run TC	128	11.01	6.00	17.494	144
	NHS Trust Hospital	4,693	13.42	9.00	16.646	249
	Private Hospital	22	7.27	6.00	3.120	12
	Total	4,874	13.29	8.00	16.598	249
H80	ISTC	1,181	4.81	5.00	1.545	17
	NHS-Run TC	620	6.03	5.00	3.552	41
	NHS Trust Hospital	22,524	7.71	6.00	6.945	372
	Private Hospital	712	5.01	5.00	1.920	23
	Total	25,037	7.46	6.00	6.673	372
H81	ISTC	517	4.30	4.00	1.675	21
	NHS-Run TC	931	5.25	5.00	2.611	24
	NHS Trust Hospital	12,191	6.56	6.00	5.158	154
	Private Hospital	122	4.85	4.00	2.479	24
	Total	13,761	6.37	5.00	4.948	154

The differences in the ALOS are more clearly seen below in bar chart format. At the top of the charts are error bars (5%). The error bars show the variability in the measures which are plotted in the chart. Again, in all cases ISTCs have the lowest ALOS, followed by Private Hospitals, NHS TCs and then NHS Trust Hospitals.

Figure 4.1 ALOS - HRG 04 – Primary Knee Replacement

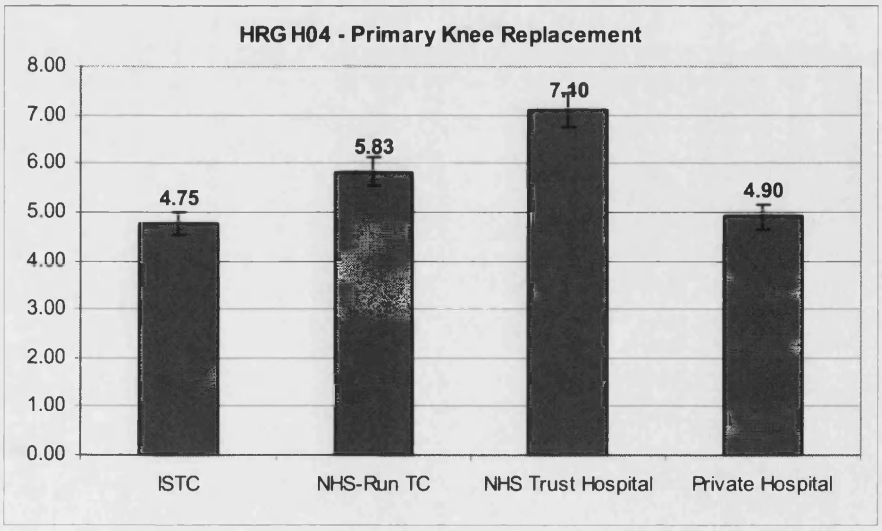


Figure 4.2 ALOS – HRG 71 – Revisional Procedures to Hips

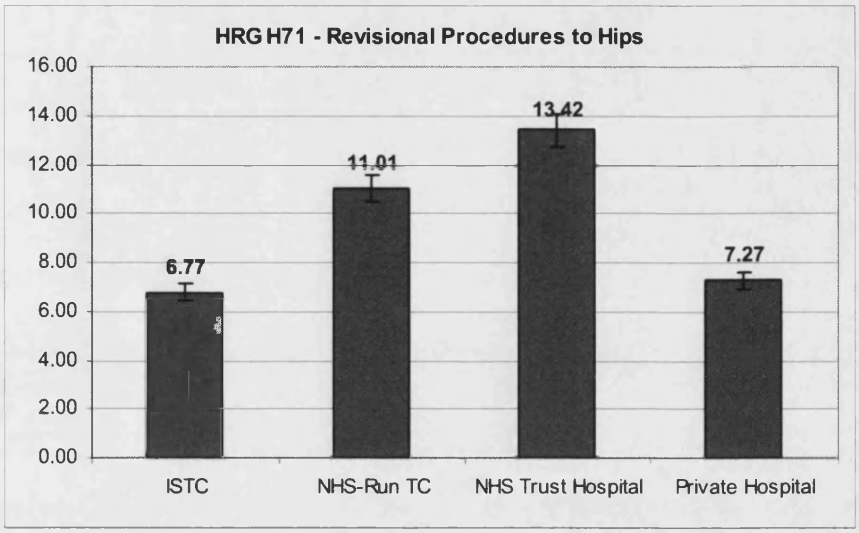


Figure 4.3 ALOS - HRG 80 – Primary Hip Replacement Cemented

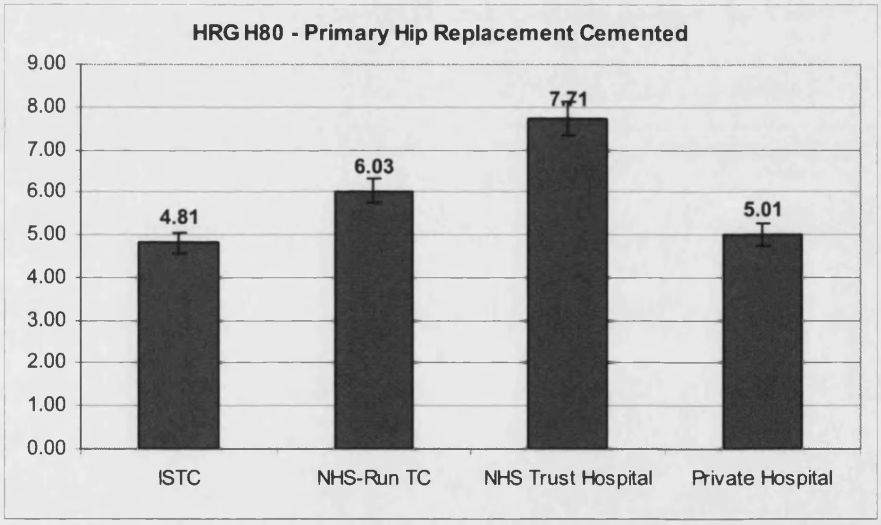
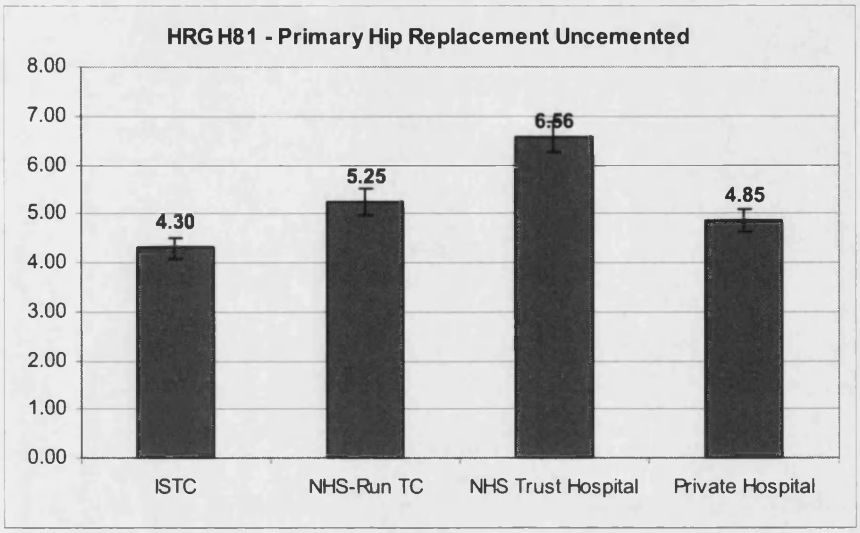


Figure 4.4 ALOS -HRG 81 – Primary Hip Replacement Uncemented



The above ALOS analysis shows only four (4) HRG procedure areas. This is due to the fact that a large proportion of the procedures conducted in Treatment Centres are day cases. Data by the hour or minute is not available. Therefore, per cent of day case out of total procedures was used for the respective HRGs. The results illustrated below are different. In four out of eight cases, ISTCs have the largest day case rate, three of the eight the NHS TCs and in one procedure area the NHS Trust Hospital and Private Hospitals have the highest day case rate.

Table 4.3 Provider Day Case Rates

HRG	Facility Type	N	Mean	Median
B13	ISTC	3,196	**89%**	1.00
	NHS-Run TC	1,666	**100%**	1.00
	NHS Trust Hospital	233,504	**97%**	1.00
	Private Hospital	870	**42%**	0.00
	Total	239,236	**97%**	1.00
F71	ISTC	23	**35%**	0.00
	NHS-Run TC	63	**25%**	0.00
	NHS Trust Hospital	3,427	**8%**	0.00
	Private Hospital	7	**0%**	0.00
	Total	3,520	**8%**	0.00
F72	ISTC	109	**68%**	1.00
	NHS-Run TC	140	**56%**	1.00
	NHS Trust Hospital	8,223	**37%**	0.00
	Private Hospital	22	**18%**	0.00
	Total	8,494	**37%**	0.00
F73	ISTC	34	**76%**	1.00
	NHS-Run TC	59	**47%**	0.00
	NHS Trust Hospital	2,589	**33%**	0.00
	Private Hospital	8	**13%**	0.00
	Total	2,690	**33%**	0.00
F74	ISTC	379	**69%**	1.00
	NHS-Run TC	264	**81%**	1.00
	NHS Trust Hospital	11,703	**70%**	1.00
	Private Hospital	58	**21%**	0.00
	Total	12,404	**70%**	1.00
H10	ISTC	4,734	**65%**	1.00
	NHS-Run TC	2,692	**67%**	1.00
	NHS Trust Hospital	80,435	**75%**	1.00
	Private Hospital	2,658	**87%**	1.00
	Total	90,519	**75%**	1.00
H19	ISTC	24	**83%**	1.00
	NHS-Run TC	42	**69%**	1.00
	NHS Trust Hospital	913	**49%**	0.00
	Private Hospital	15	**7%**	0.00
	Total	994	**50%**	1.00
H21	ISTC	43	**14%**	0.00
	NHS-Run TC	50	**4%**	0.00
	NHS Trust Hospital	1,895	**17%**	0.00
	Private Hospital	38	**3%**	0.00
	Total	2,026	**16%**	0.00

The differences are more clearly seen below in bar chart format. Again, we use error bars (5%), to the show variability in the measures.

Figure 4.5 Day Case Rate - HRG B13 - Cataracts

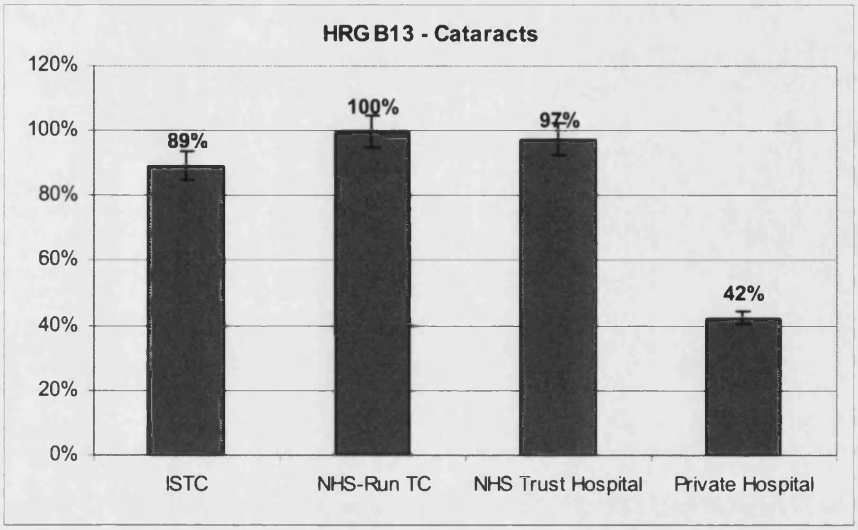


Figure 4.6 Day Case Rate - HRG 71 – Abdominal Hernia Procedures >69 or w cc

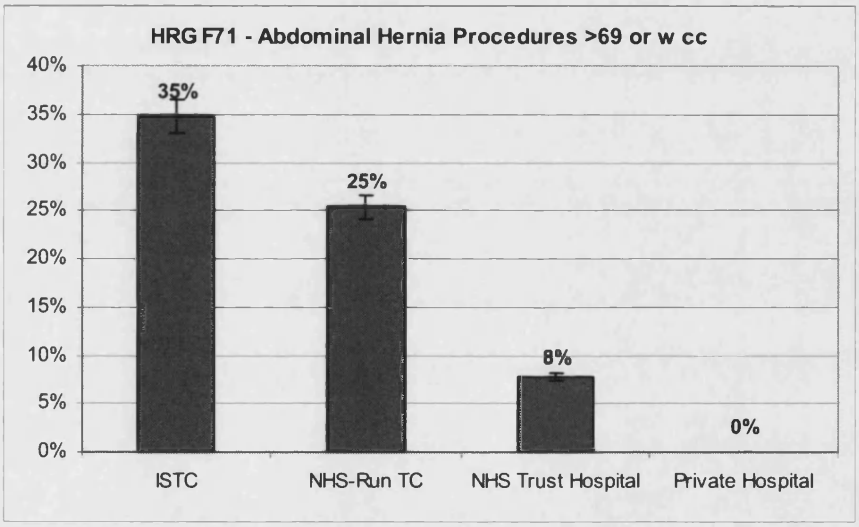


Figure 4.7 Day Case Rate - HRG 72 – Abdominal Hernia Procedures <70 or w/o cc

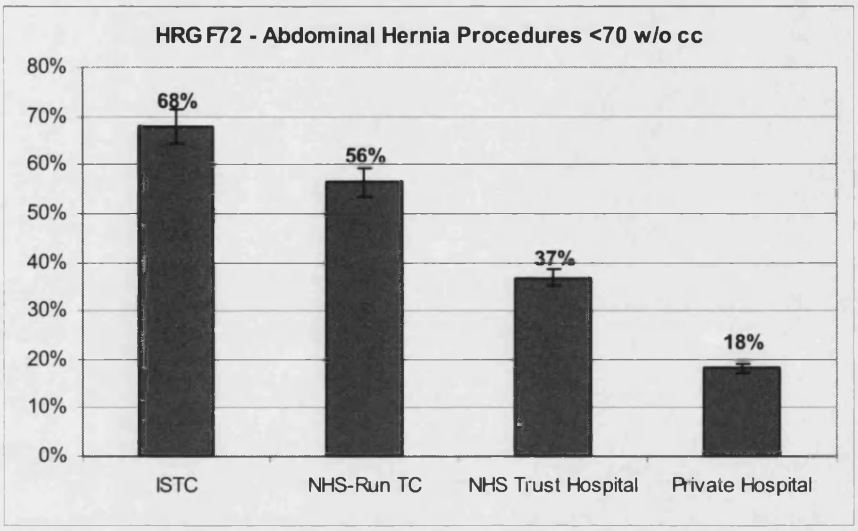


Figure 4.8 Day Case Rate - HRG 73 – Inguinal Hernia Procedures >69 or w cc

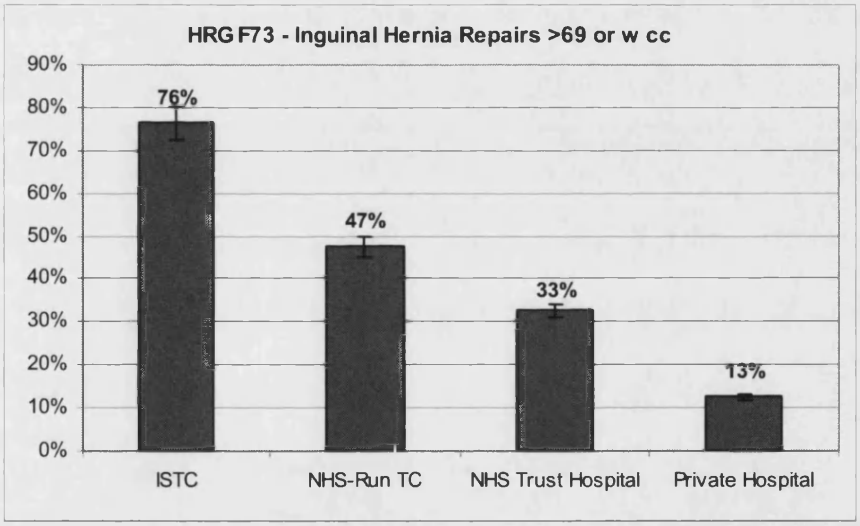


Figure 4.9 Day Case Rate - HRG 10 – Arthroscopies

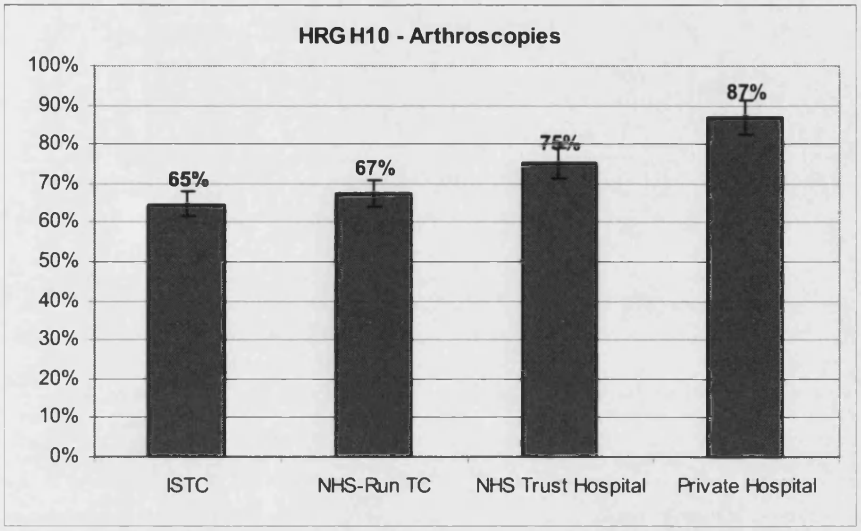


Figure 4.10 Day Case Rate - HRG 19 – Soft Tissue Procedures <70 w/o cc

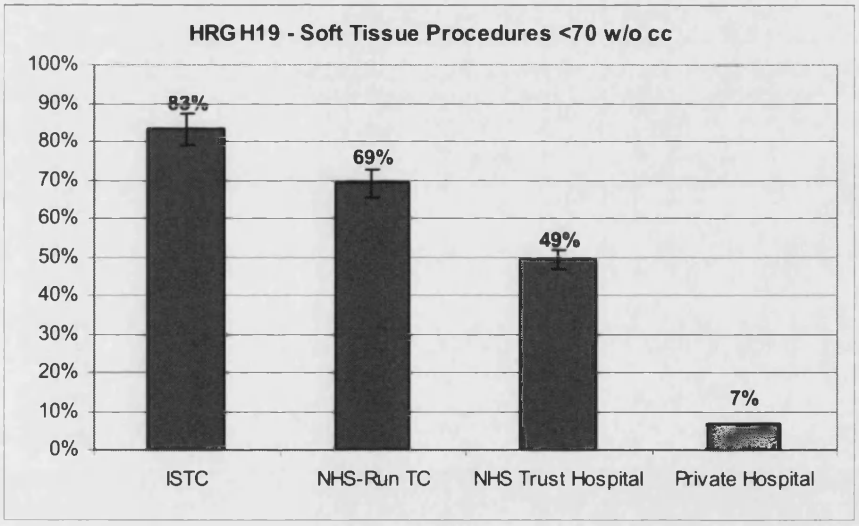
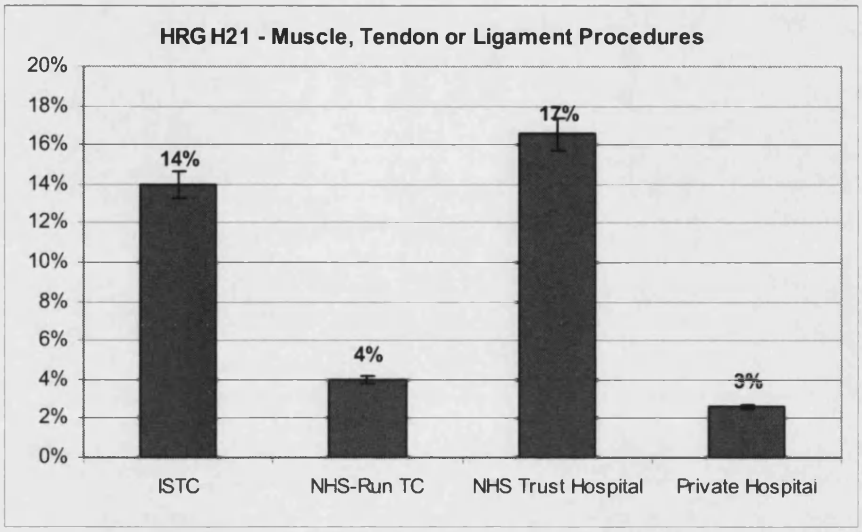


Figure 4.11 Day Case Rate - HRG 21 – Muscle, Tendon or Ligament Procedures



Death rates and patient readmission rates are detailed in the patient record data and therefore have been used as measures of quality outcomes. Clearly, any changes in death rates and readmissions with the advent of the Treatment Centre Programme can thus be assessed. The death rate indicator used is patient deaths within 30 days of hospitalisation. Patient readmission rates are defined as patients readmitted to the hospital within 30 days following discharge.

We examined these to assess if the death rates were higher in the treatment centres and more specifically within the ISTCs. Clearly, this is not the case. The bar charts are not shown below as all the death rates are significantly below 1 per 1,000.

Table 4.4 Provider Death Rates

HRG	Facility Type	N	Number Deaths	Rate per 1000
B13	ISTC	3,196	1	0.003
	NHS-Run TC	1,666	0	0.000
	NHS Trust Hospital	233,504	3	0.000
	Private Hospital	870	0	0.000
	Total	239,236	4	0.000
F71	ISTC	23	0	0.000
	NHS-Run TC	63	0	0.000
	NHS Trust Hospital	3,427	10	0.029
	Private Hospital	7	0	0.000
	Total	3,520	10	0.028
F72	ISTC	109	0	0.000
	NHS-Run TC	140	0	0.000
	NHS Trust Hospital	8,223	0	0.000
	Private Hospital	22	0	0.000
	Total	8,494	0	0.000
F73	ISTC	34	0	0.000
	NHS-Run TC	59	0	0.000
	NHS Trust Hospital	2,589	3	0.012
	Private Hospital	8	0	0.000
	Total	2,690	3	0.011
F74	ISTC	379	0	0.000
	NHS-Run TC	264	0	0.000
	NHS Trust Hospital	11,703	0	0.000
	Private Hospital	58	0	0.000
	Total	12,404	0	0.000
H04	ISTC	2,100	2	0.010
	NHS-Run TC	2,179	2	0.009
	NHS Trust Hospital	47,064	111	0.024
	Private Hospital	1,138	0	0.000
	Total	52,481	115	0.022
H10	ISTC	4,734	0	0.000
	NHS-Run TC	2,692	0	0.000
	NHS Trust Hospital	80,435	0	0.000
	Private Hospital	2,658	0	0.000
	Total	90,519	0	0.000
H19	ISTC	24	0	0.000
	NHS-Run TC	42	0	0.000
	NHS Trust Hospital	913	0	0.000
	Private Hospital	15	0	0.000
	Total	994	0	0.000
H21	ISTC	43	0	0.000
	NHS-Run TC	50	0	0.000
	NHS Trust Hospital	1,895	0	0.000
	Private Hospital	38	0	0.000
	Total	2,026	0	0.000
H71	ISTC	33	0	0.303
	NHS-Run TC	130	0	0.000
	NHS Trust Hospital	4,703	71	0.051
	Private Hospital	22	0	0.000
	Total	4,888	71	0.051
H80	ISTC	1,192	0	0.000

	NHS-Run TC	627	0	0.000
	NHS Trust Hospital	22,563	19	0.031
	Private Hospital	716	0	0.000
	Total	25,098	19	0.028
H81	ISTC	526	0	0.000
	NHS-Run TC	940	0	0.000
	NHS Trust Hospital	12,225	19	0.016
	Private Hospital	123	0	0.000
	Total	13,814	19	0.014

We then looked at hospital readmission rates. In seven (7) out of twelve (12) procedure areas, the ISTCs had the lowest readmission rates. In two (2) procedure areas ISTCs were tied with the NHS and in another procedure area (1), ISTCs were tied with the Private Hospitals. In one (1) procedure area, the Private Hospitals had the lowest readmission rate (0 per cent) but these facilities reported only 7 cases.

Table 4.5 Provider Readmission Rates

HRG	Facility Type	N	Per cent
B13	ISTC	3,196	0.91%
	NHS-Run TC	1,666	0.78%
	NHS Trust Hospital	233,504	1.61%
	Private Hospital	870	1.03%
	Total	239,236	1.60%
F71	ISTC	23	4.35%
	NHS-Run TC	63	4.76%
	NHS Trust Hospital	3,427	9.22%
	Private Hospital	7	0.00%
	Total	3,520	9.09%
F72	ISTC	109	1.83%
	NHS-Run TC	140	4.29%
	NHS Trust Hospital	8,223	6.49%
	Private Hospital	22	9.09%
	Total	8,494	6.40%
F73	ISTC	34	2.94%
	NHS-Run TC	59	5.08%
	NHS Trust Hospital	2,589	4.71%
	Private Hospital	8	0.00%
	Total	2,690	4.68%
F74	ISTC	379	1.85%
	NHS-Run TC	264	1.89%
	NHS Trust Hospital	11,703	3.20%
	Private Hospital	58	6.90%
	Total	12,404	3.14%
H04	ISTC	2,100	2.90%
	NHS-Run TC	2,179	4.82%
	NHS Trust Hospital	47,064	5.85%
	Private Hospital	1,138	4.83%
	Total	52,481	5.66%
H10	ISTC	4,734	0.68%
	NHS-Run TC	2,692	1.45%
	NHS Trust Hospital	80,435	1.29%
	Private Hospital	2,658	0.83%
	Total	90,519	1.25%
H19	ISTC	24	0.00%
	NHS-Run TC	42	4.76%
	NHS Trust Hospital	913	2.30%
	Private Hospital	15	0.00%
	Total	994	2.31%
H21	ISTC	43	0.00%
	NHS-Run TC	50	0.00%
	NHS Trust Hospital	1,895	2.43%
	Private Hospital	38	2.63%
	Total	2,026	2.32%
H71	ISTC	33	3.03%
	NHS-Run TC	130	6.92%
	NHS Trust Hospital	4,703	8.21%
	Private Hospital	22	4.55%
	Total	4,888	8.12%
H80	ISTC	1,192	3.69%

	NHS-Run TC	627	4.63%
	NHS Trust Hospital	22,563	6.39%
	Private Hospital	716	5.17%
	Total	25,098	6.18%
H81	ISTC	526	3.99%
	NHS-Run TC	940	5.11%
	NHS Trust Hospital	12,225	5.81%
	Private Hospital	123	6.50%
	Total	13,814	5.70%

The differences are more clearly seen below in bar chart format below.

Figure 4.12 Readmission Rates – HRG B13 - Cataracts

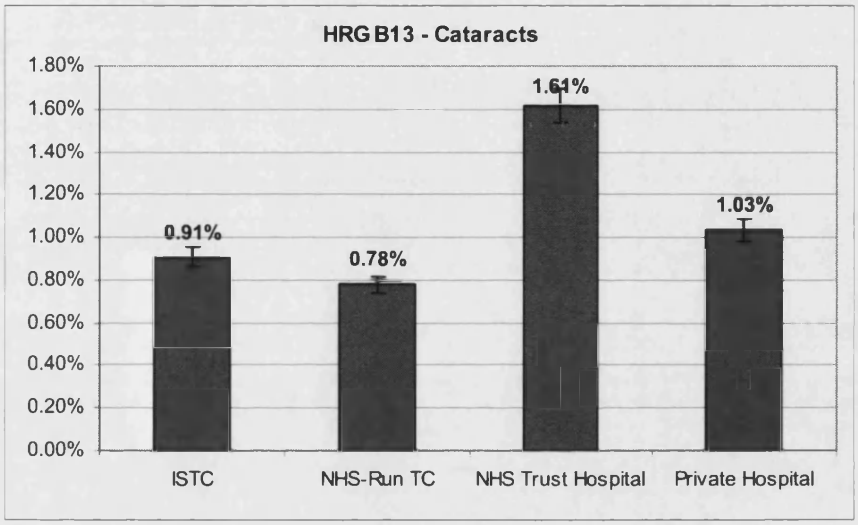


Figure 4.13 Readmission Rates - HRG 71 – Abdominal Hernia Procedures >69 or w cc

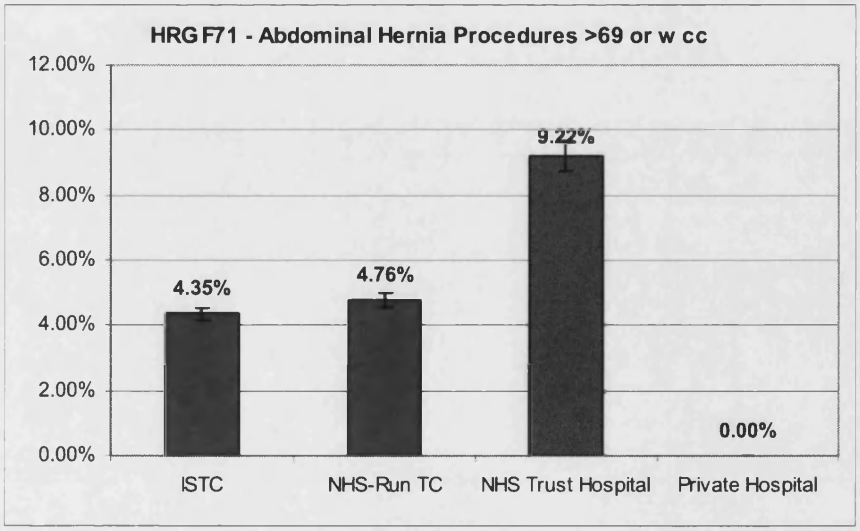


Figure 4.14 Readmission Rates - HRG 72 – Abdominal Hernia Procedures <70 or w/o cc

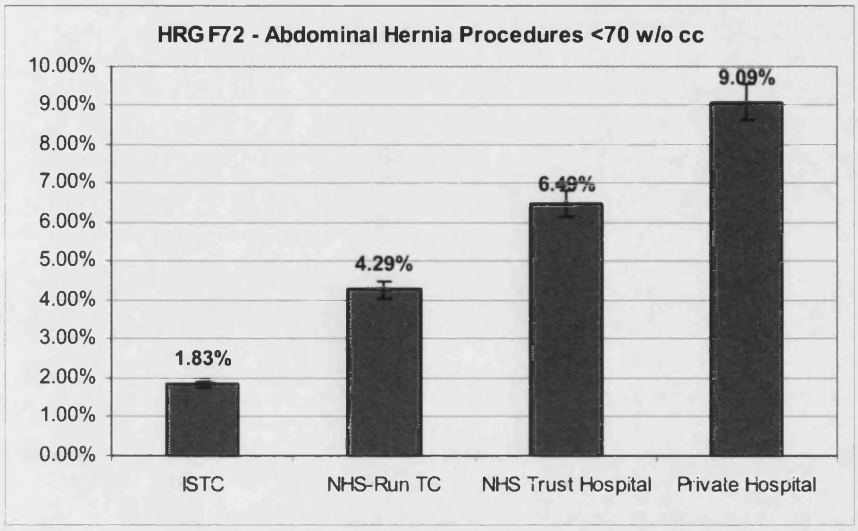


Figure 4.15 Readmission Rates – HRG B73 – Inguinal Hernia Repairs >69 or w cc

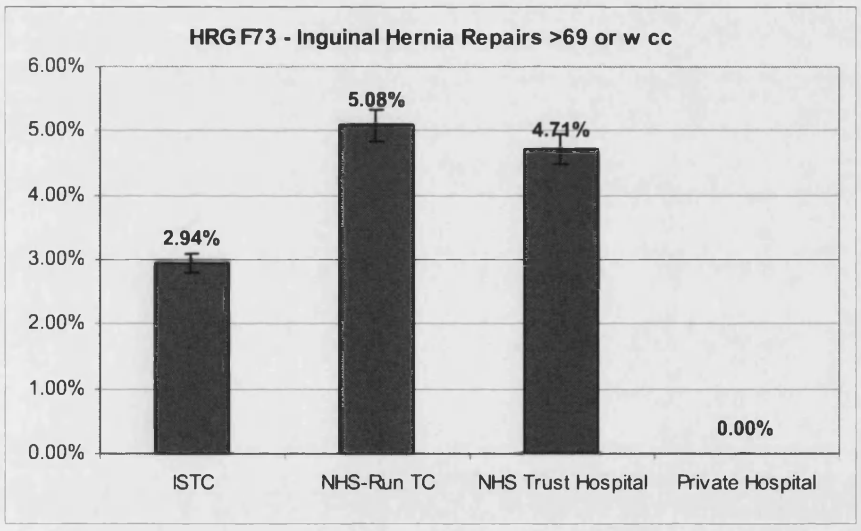


Figure 4.16 Readmission Rates – HRG F74 - Inguinal Hernia Repairs <70 or w/o cc

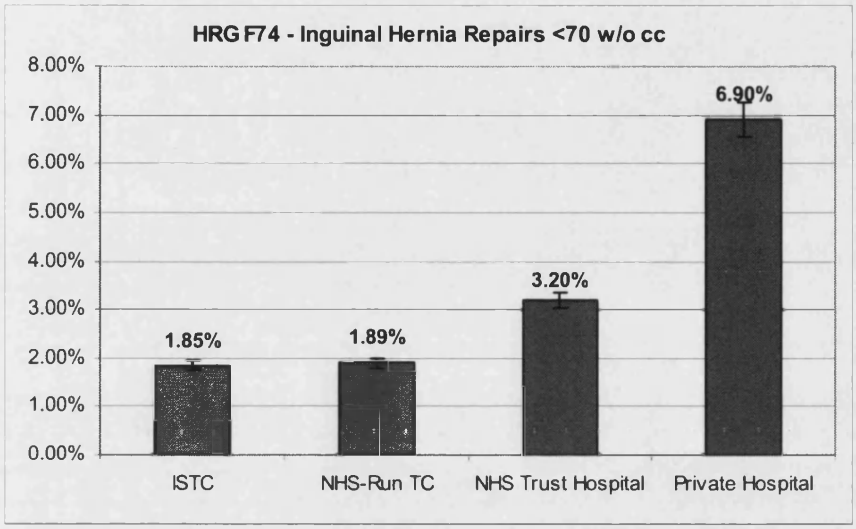


Figure 4.17 Readmission Rates – HRG H10- Arthroscopies

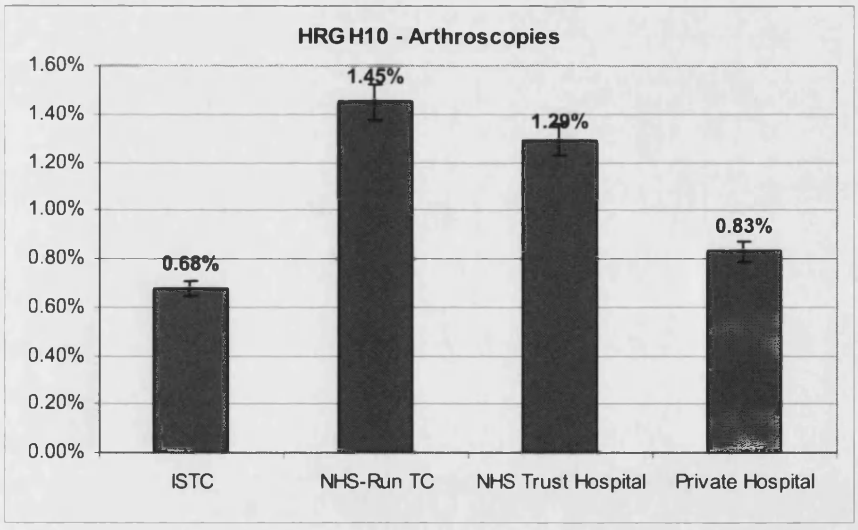


Figure 4.18 Readmission Rates – HRG H19 – Soft Tissue Procedures <70 w/o cc

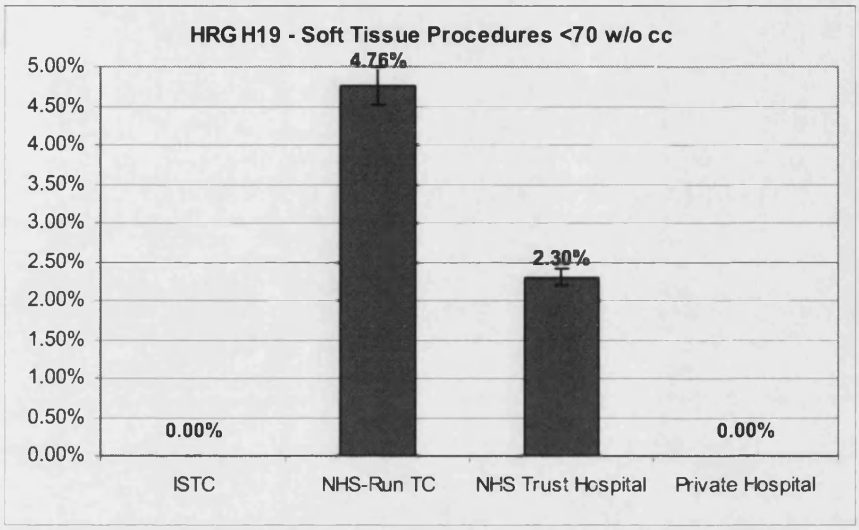


Figure 4.19 Readmission Rates – HRG H21 – Muscle, Tendon or Ligament Procedures

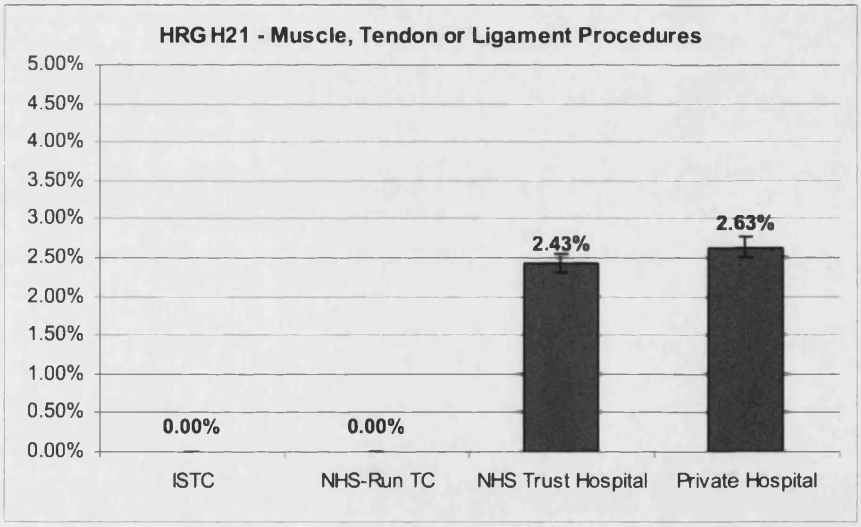


Figure 4.20 Readmission Rates – HRG H04 – Primary Knee Replacement

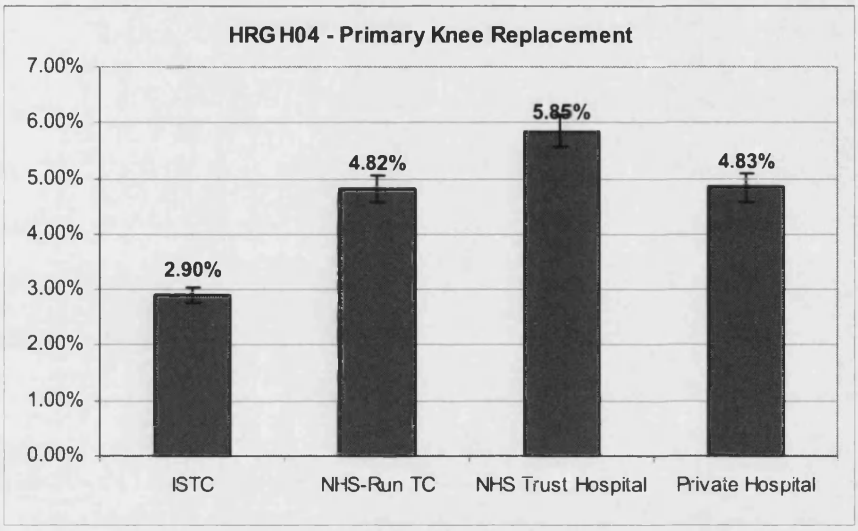


Figure 4.21 Readmission Rates – HRG H71 – Revisional Procedures to Hips

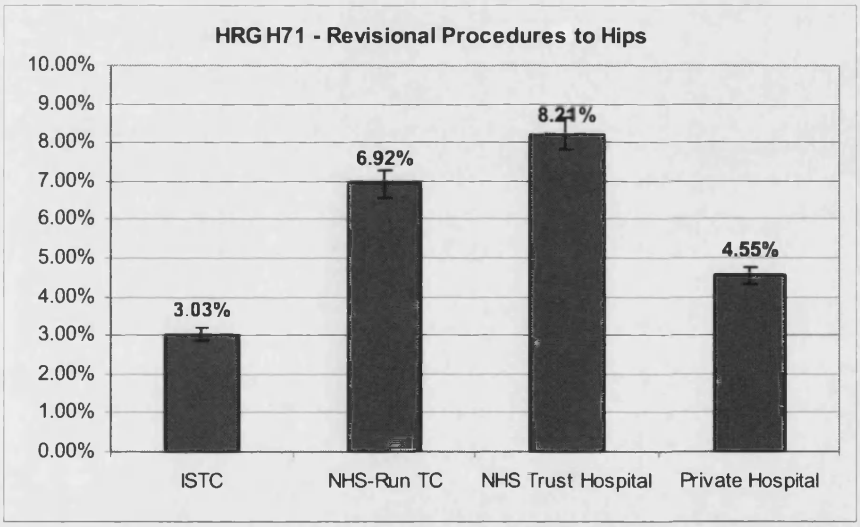


Figure 4.22 Readmission Rates – HRG H80 – Primary Hip Replacement Cemented

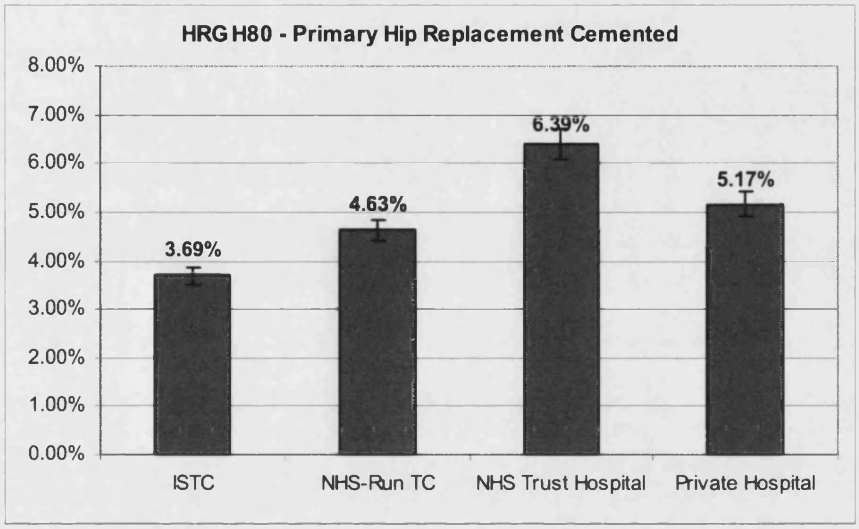
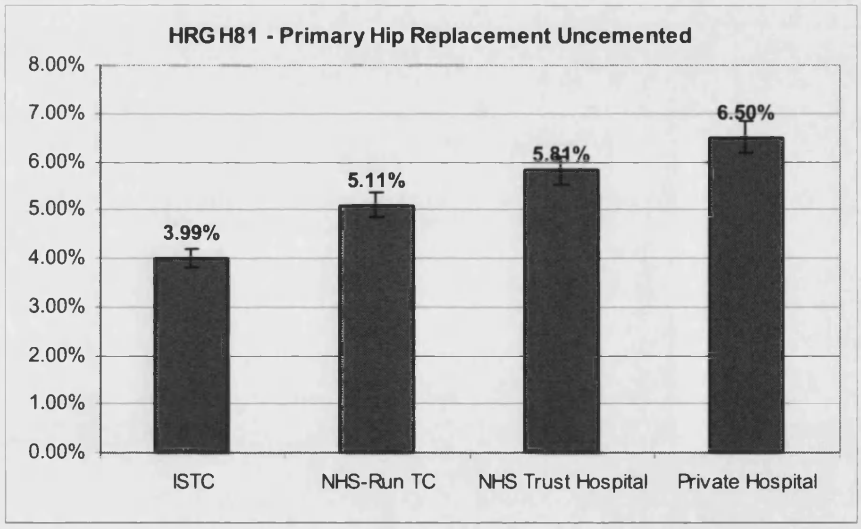


Figure 4.23 Readmission Rates – HRG H81 – Primary Hip Replacement Uncemented



In summary, there is a difference in the ALOS of facilities. The differences are not as strong when assessing the day case rates. However, what is clear is that ISTCs have better efficiency indicators, followed by Private Hospitals, NHS TCs and then NHS Trust Hospitals.

From the quality outcomes standpoint, there is very little difference in the death rates. Readmission rates are lower in the ISTCs. The NHS TCs were slightly better than in the Private Hospitals (by number of procedure areas). NHS Trust Hospitals had the highest readmission rates within these HRGs. This is to be expected, as the NHS should see a higher case mix of patients.

There are a number of issues with the basic analyses conducted. For example, private hospitals have a very low number of cases, the NHS Trust Hospitals provide a large proportion of the total cases assessed (75 per cent) and one procedure area, cataracts, account for over 52% of the total day cases accessed. The difference in means analysis conducted in the following section will attempt to account for these weaknesses by weighting these differences.

4.3.2 Difference in Means Analysis

In the WMD analysis six different comparisons were made. These consisted of:

1. ISTC vs NHS TCs
2. ISTC vs NHS
3. ISTC vs. IS Providers
4. NHS TC vs IS Providers
5. NHS vs IS Providers
6. NHS vs NHS TCs

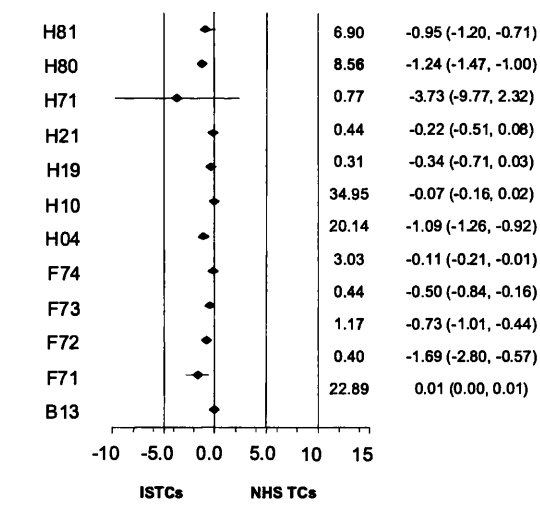
Patients are grouped by HRGs and a number of indicators have been assessed. These indicators included:

1. Length of stay in days (ALOS)
2. Proportion of day cases of total discharges
3. 30 day death rates
4. Inpatient readmissions
5. Age in years
6. Deprivation (IMD) score

The initial analysis assesses the length of stay in days (ALOS) for the cataracts, hernias and orthopedic procedures studied. It was found that the mean length of stay for an ISTC was significantly lower than the other facility types (See figures below). The average length of stay (when all procedures were pooled together) at an ISTC was 0.16 days less than at an IS Provider (Pooled effect: WMD = -0.16; 95% confidence interval -0.31 to -0.01). At the same time, the average pooled length of stay at an IS Providers was 0.75 days less than the average stay at an NHS TC (Pooled effect: WMD = -0.75; 95% confidence interval -0.99 to -0.51). The average pooled length of stay at an NHS TCs was 0.36 days less than at an NHS Provider (Pooled effect: WMD = -0.36; 95% confidence interval -0.52 to -0.21). An NHS Trust Hospital had a significantly higher average length of stay than the other facility types.

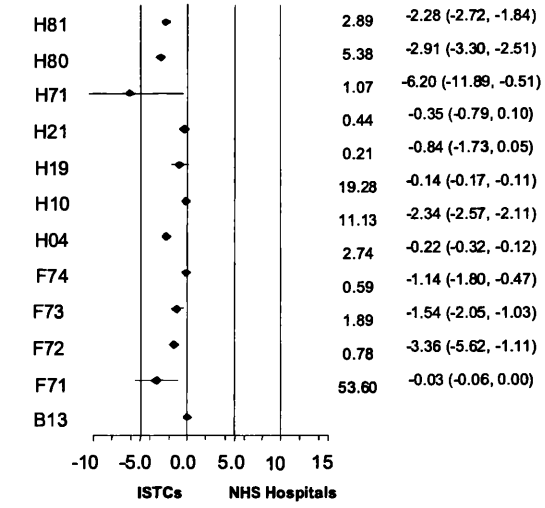
Length of Stay in Days (ALOS) – All Cases

Figure 4.23: Forest plot for ALOS (Days): ISTCs vs. NHS TCs (2007)



Pooled effect: weighted mean difference
-0.46; 95% confidence interval -0.54 to -0.33

Figure 4.24: Forest plot for ALOS (Days): ISTCs vs. NHS Hospitals (2007)



Pooled effect: weighted mean difference
-0.66; 95% confidence interval -0.84 to -0.48

Figure 4.25: Forest plot for ALOS (Days): ISTCs vs. IS Providers (2007)

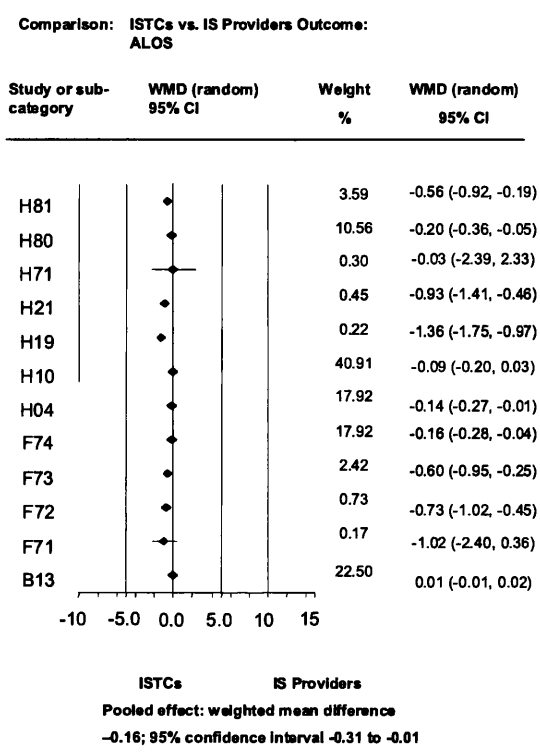


Figure 4.26: Forest plot for ALOS (Days): IS Providers vs. NHS TCs (2007)

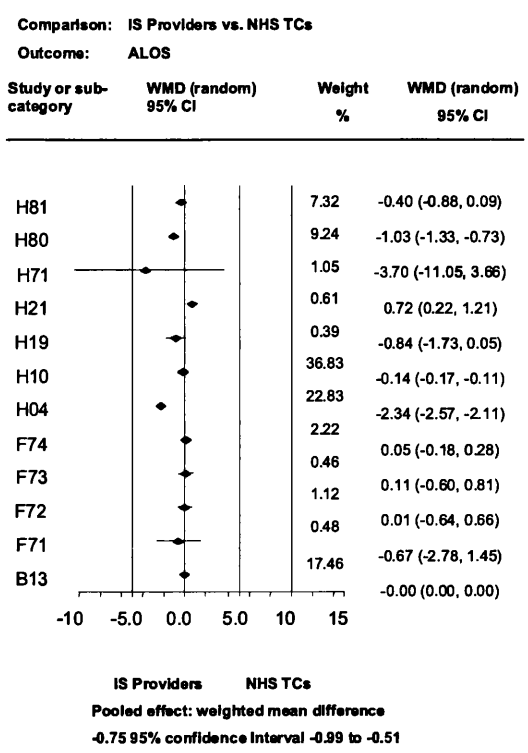


Figure 4.27: Forest plot for ALOS (Days): IS Providers vs. NHS Hospitals (2007)

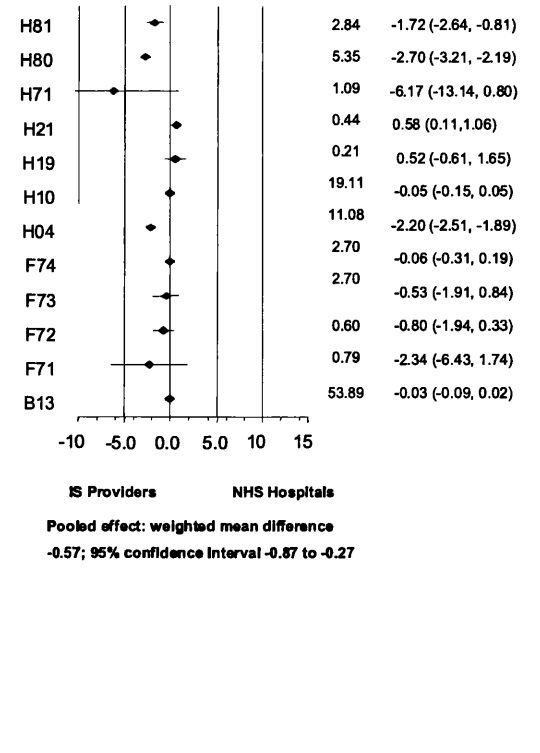
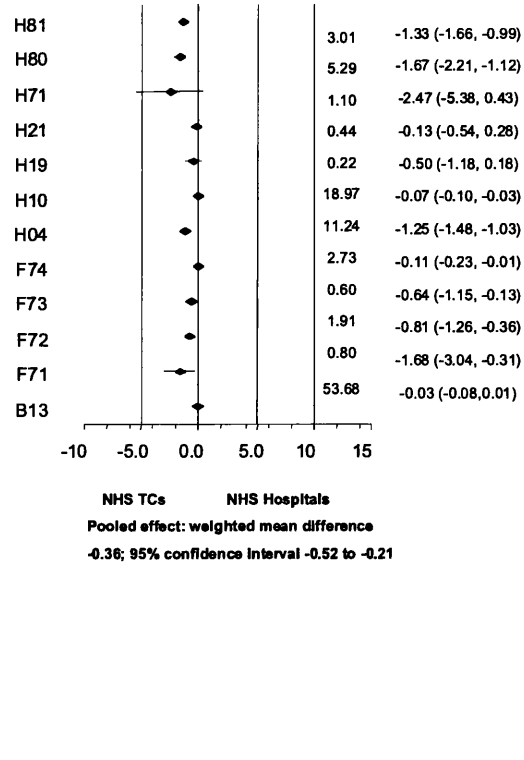


Figure 4.28: Forest plot for ALOS (Days): NHS TCs vs NHS Hospitals (2007)



An important limitation to the initial assessment in the above figures is that a number of the HRGs are predominantly outpatient (OP) procedures. For example, cataracts (B13) accounted for over 50% of the total procedures, and this procedure was predominantly provided by the NHS. This has a significant impact on the pooled effect.

Therefore, a follow up analysis was conducted that only assesses HRG procedures that are typically undertaken on an inpatient basis (see below). The analysis shows the same order of outcomes by provider with the ISTCs having the lowest WMD, followed by private hospitals, NHS TCs and then NHS Trust Hospitals. However, the evidence in this subset of HRGs is even more profound, with the mean differences greater between groups and the confidence interval narrower and further from zero. In this analysis, ISTCs again had the lowest average length of stay. On average, the pooled length of stay for inpatient procedures at an ISTC was 0.20 days less than at an IS provider (Pooled effect: WMD = -0.20; 95% confidence interval -0.39 to -0.02), while IS providers tended to have an average length of stay 1.73 days less than NHS TCs (Pooled effect: WMD = -1.73; 95% confidence interval -2.20 to -1.25) and NHS TCs had an ALOS 1.44 days less than NHS Providers (Pooled effect: WMD = -1.44; 95% confidence interval -1.90 to -0.97).

Length of Stay in Days (ALOS) – Inpatient Cases Only

Figure 4.29: Forest plot for ALOS (Days): ISTCs vs. NHS TCs (2007)

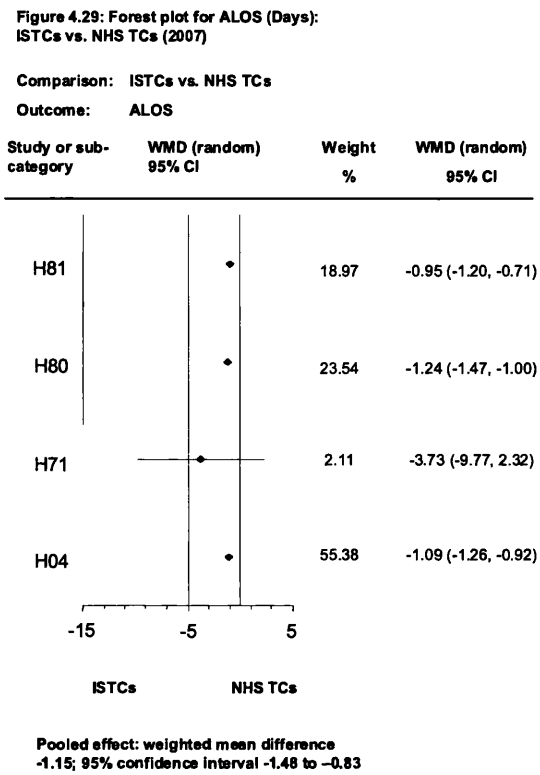


Figure 4.30: Forest plot for ALOS (Days): ISTCs vs. NHS Hospitals (2007)

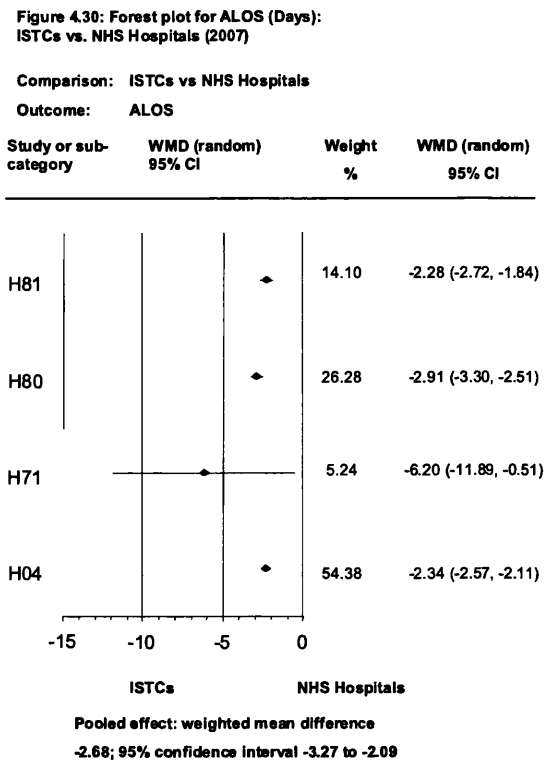


Figure 4.31: Forest plot for ALOS (Days): ISTCs vs. IS Providers (2007)

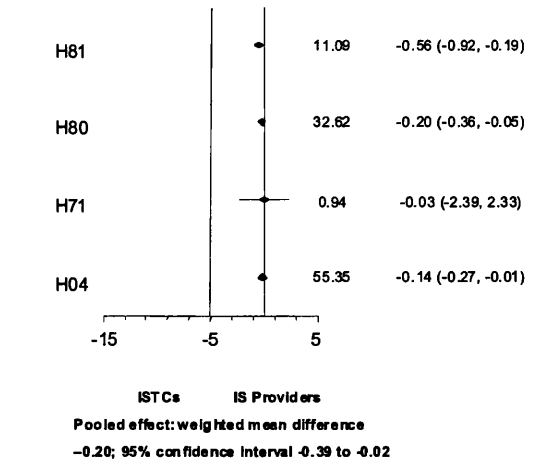


Figure 4.32: Forest plot for ALOS (Days): IS Providers vs. NHS TCs (2007)

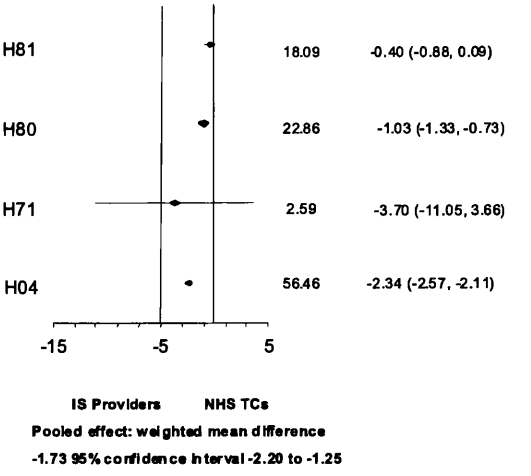


Figure 4.33: Forest plot for ALOS (Days): IS Providers vs. NHS Hospitals (2007)

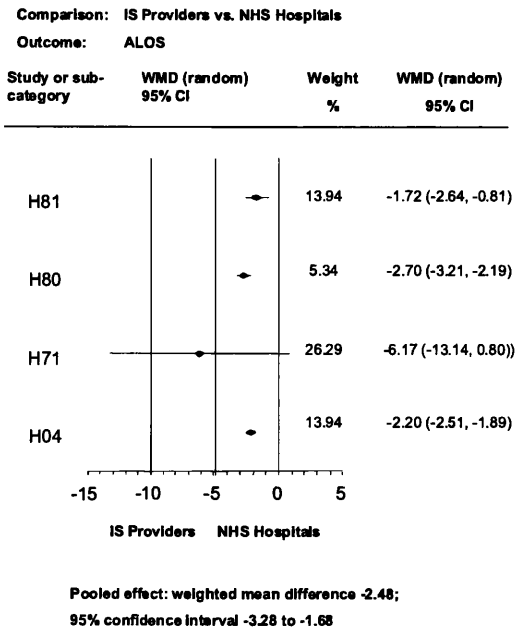
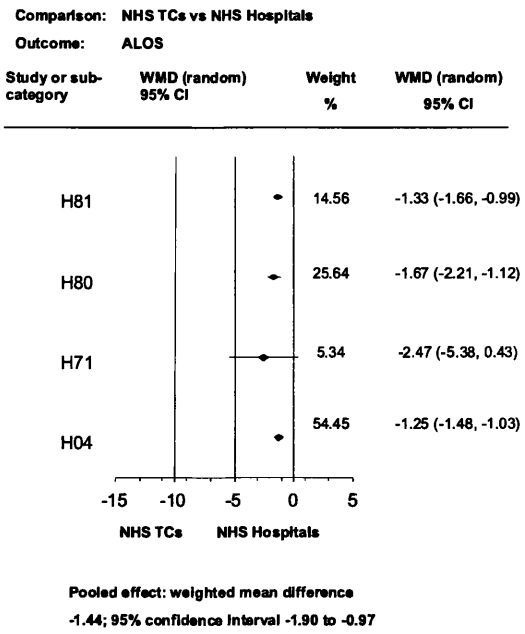


Figure 4.34: Forest plot for ALOS (Days): NHS TCs vs. NHS Hospitals (2007)



For day case procedures, the mean difference analysis by ALOS does not work very well, because effectively all day cases have an average length of stay of zero (0). As a result, procedures that are typically one-day procedures were removed from the previous analysis and analysed as a proportion of day cases of total procedures (See Appendix C). In this case, the higher the number, the more often a procedure results in the patient being released the same day as the procedure.

Upon initial analysis, the evidence here is different. In this case the NHS Trust Hospitals and NHS TCs had the highest day case per centage of the assessed procedure groups that were day cases (with no statistical difference between each other), followed by ISTCs and then the Private Hospitals. The differences here, from the initial statistical analysis, are due to a disproportion of cases in a certain number of procedure areas (e.g. cataracts and arthroscopies).

On average, NHS TCs had a day case rate of 0.80% more than NHS Providers, but not significant (Pooled effect: WMD = 0.80%; 95% confidence interval -0.80 to 2.40). ISTCs had a day case rate of 5.10% less than the NHS TCs (Pooled effect: WMD = -5.10%; 95% confidence interval -7.90 to -2.40) and a day case rate of 6.60% less than the NHS Trust Hospitals (Pooled effect: WMD = -6.60%; 95% confidence interval -8.00 to -5.20). The day case rate at an ISTC was 5.20% higher than at an IS provider (Pooled effect: WMD = 5.20%; 95% confidence interval 2.00% to 8.40%).

For quality outcomes data, we use two points of measurement: death rates during hospitalisation (in hospital mortality) and patient readmission data.

The death rate does not show evidence of differing quality outcomes (See Appendix D) between any of the provider groups (Pooled effect: WMD = 0.00; largest 95% confidence interval -0.10 to 0.00). Because different providers had different case loads, death rate was used, rather than raw deaths. The evidence is per cent differences in the death rate between providers. However, the lack of any difference between providers is interesting in itself. While the evidence does not suggest that quality is better in any of the facilities, at the same time, the level of quality appears to be equally good at TCs as it is at NHS Trust hospitals.

Further, with respect to patient readmission rates, only in the case of ISTCs versus NHS Trust Hospitals, is there a statistically significant difference (See Appendix E). On average, ISTCs readmitted patients 1.30% less often than NHS Trust Hospitals (Pooled effect: WMD = -1.30; 95% confidence interval -2.20 to -0.30). In all the other comparisons, the confidence interval includes 0 and is therefore not statistically significant – however, it is important to note that the data does not include information on whether patients were readmitted to a different provider. Again, to facilitate comparison, readmission rates were used, rather than raw readmission numbers. The evidence is per cent differences in the readmission rate between providers.

A potential factor affecting ALOS is patient case mix. There are two indicators that we can use to assess possible differences in case mix. These indicators are patient age (Appendix F) and patient income deprivation, or IMD (See Appendix G).

In theory, the older the patient, the higher the co-morbidities are to be expected. If the treatment centres are cream skimming, or actively selecting less difficult patients to treat, we would expect patient age to be lower in treatment centres than in General Hospitals.

The evidence for discrimination by age is slightly more difficult to interpret as age is organised by age band (categorical data) rather than year. Because the age bands are 5-year intervals, differences in the average age selected by each provider are difficult to determine and must be larger than five years to be apparent. Nevertheless, one can broadly surmise that the average age for different facilities is not greater than five years, because in all comparisons, except for the comparison of IS Providers and NHS Trust Hospital, the data is statistically insignificant (the confidence intervals cross zero). All the weighted mean difference comparison analyses are significantly less than 0.50, meaning that the comparison providers are more likely to be in the same band than in different

ones. There is only a slight differential in the confidence interval away from zero when comparing IS Providers and NHS Trust Hospitals, but the WMD is still less than 0.50 (Pooled effect: WMD = 0.41; 95% confidence interval 0.12 to 0.70).

With respect to deprivation, the evidence suggests that deprivation scores also differ very little. There is only a statistically significant difference when comparing ISTCs and NHS TCs, and when comparing all three providers with NHS Trust hospitals. This is not especially surprising.

Again, the evidence is slightly more difficult to interpret because deprivation scores are categorical data. As a result, the mean difference estimates the difference between the categorical means. All the weighted mean difference are significantly less than 0.50, meaning the averages are more likely to share a category, than to not. What the data does not tell us is the mean deprivation scores of the providers. However, this is not specifically relevant for this analysis. Here we intend to assess merely whether there are significant differences in the deprivation scores as a proxy for potential case mix differentials between providers. Further, the evidence here is consistent with a recent study by York University which found no evidence of differences in case mix between providers (Mason, Miraldo et al. 2007).

Table 4.6 Summary of Main Direction of Findings Across HRGs

Indicator	Direction of Findings
Length of stay in days (ALOS) - All	ISTCs < IS Providers < NHS TCs < NHS Trust Hospitals
Length of stay in days (ALOS) - Only inpatient cases	ISTCs < IS Providers < NHS TCs < NHS Trust Hospitals
Proportion of day cases of total discharges	NHS Trust Hospitals = NHS TCs < ISTCs < IS Providers
30 day death rates	No difference
Inpatient readmissions	ISTC < NHS Trust Hospitals. No significant difference for other comparisons.
Age in years	IS Providers < NHS Trust Hospitals. No significant difference for other comparisons.
Deprivation (IMD) score	ISTCs = IS Providers < NHS TCs < NHS Trust Hospitals

In sum, the evidence is indicative of significant differences in performance with respect to efficiency, when ALOS is used as a proxy. Generally speaking we see that the efficiency performance indicators are highest for ISTCs, followed by IS Providers, NHS TCs and lastly NHS Trust Hospitals. When we use proportion of day cases of total discharges to measure efficiency, the evidence is different. We see that the efficiency performance indicators are highest for NHS TCs and NHS Trust Hospitals, where there is no difference between the two facility types, followed by ISTCs and then Private Hospitals. There are no significant differences in patient outcomes data when 30 day death rates and patient readmission rates are used as proxies for quality. We have also assessed potential differences in age and deprivation, with a view that these may point to differences in case mix. We found very little, if any, difference between providers.

Theory suggests that we should see differences in efficiency and quality that result from differences in ownership. Theory also suggests that facilities providing a more focused approach should have better performance. With respect to efficiency, as measured by ALOS, the evidence is suggestive that this is true. The evidence is less clear when assessing day case rate evidence. With respect to quality outcomes, we see very little evidence of differences. However, at the same time, we can say that, while quality outcomes may not be better, they are certainly no worse, as was feared when the Treatment Centre program was initially proposed. Generally, there is a stronger association between efficiency when looking at ALOS and ownership than between efficiency and type of facility. However, what we do not know is how much the differences in efficiency are due to ownership and how much are due to the type of facility. To better investigate this, the researcher conducted basic regression analysis.

4.3.3 Regression Analysis

The regression model uses several independent variables from the patient record. The equation below is the model used for the analysis.

$$\log (EI) = a + b_1O + b_2T + b_3A + b_4D$$

The logarithm of the dependent variable (EI) is used as the variable is skewed. EI is the Efficiency Indicator (ALOS in this instance), O is Ownership (Private = 0, Public = 1), T is type of facility (Treatment Centre = 0, Hospital = 1), A is age (as determined by

the five year age bands), and D is deprivation (as determined by the relative deprivation index).

The regression analysis was conducted to assess in more detail the relationships between average length of stay and the independent variables. The regression was run once for each type of inpatient procedure and showed varying levels of explanatory power for different procedures. Because the dependent variable, average length of stay, is skewed and not normally distributed, a logarithm of (ALOS) was used.

When using a log ALOS as the EI, the model gives an R^2 of 6.1% for Primary Knee Replacement (H04), an R^2 of 7.4% was obtained for Revisional Procedures to Hips (H71), an R^2 of 8.4% was obtained for Primary Hip Replacement Cemented (H80) and an R^2 of 8.7% was obtained for Primary Hip Replacement uncemented (H81). Generally speaking higher R^2 values were obtained for procedures with longer average ALOS values, such as Hip Replacement Procedures (H80, H81). While these are not strong indicators, the results are not that insignificant for cross-sectional data.

Table 4.7 Model Summary

HRG	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
H04	1	.272(a)	0.074	0.074	0.19806
H71	1	.247(b)	0.061	0.060	0.32033
H80	1	.296(a)	0.087	0.087	0.20332
H81	1	.290(b)	0.084	0.084	0.19083

a. Predictors: (Constant), deprivationID, Facility Type, ageBand, Ownership Status (private, public)
b. Predictors: (Constant), deprivationID, Ownership Status (private, public), ageBand, Facility Type

Other indicators show that, while the model is not able to predict ALOS with a high degree of accuracy, the underlying model still has significant explanatory power. The ANOVA table shows an F-ratio varying from 75.161 to 1,047.303 with all cases being significant ($p<0.05$). The F-ratio is used to test the joint significance of all independent variables – a significant result at $p<0.05$ indicates that the model's explanatory power is better than chance. The F-ratio shows that the model is significantly better at predicting the outcome than using the ALOS mean as guess. While the F-ratio varies, depending on the HRG, it generally supports the model's explanatory power.

Table 4.8 ANOVA(c)

HRG	Model		Sum of Squares	df	Mean Square	F	Sig.
H04	1	Regression	164.332	4	41.083	1,047.303	.000(a)
		Residual	2,048.925	52,232	0.039		
		Total	2,213.257	52,236			
H71	1	Regression	30.850	4	7.713	75.161	.000(b)
		Residual	475.923	4,638	0.103		
		Total	506.774	4,642			
H80	1	Regression	98.851	4	24.713	597.780	.000(a)
		Residual	1,033.103	24,990	0.041		
		Total	1,131.954	24,994			
H81	1	Regression	46.003	4	11.501	315.821	.000(b)
		Residual	500.238	13,737	0.036		
		Total	546.241	13,741			

a. Predictors: (Constant), deprivationID, Facility Type, ageBand, Ownership Status (private, public)
b. Predictors: (Constant), deprivationID, Ownership Status (private, public), ageBand, Facility Type
c. Dependent Variable: ALOSLOG

The coefficients table illustrates the parameters of the model. The b-values indicate the individual contribution of each predictor to the model. The independent variable for ownership is significant in three out of four of the regressions, and is positive in all of the regressions. Because this variable takes the value of 0 under private ownership and 1 under public ownership, a positive value indicates a higher length of stay at public facilities. The highest coefficient was obtained for hip-replacement H80, with a value of 0.106 – although, with low R^2 values, the direction (positive or negative) is more important than the actual figure.

Table 4.9 Coefficients Table

HRG	Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	Collinearity Statistics	
			B	Std. Error	Beta			B	Std. Error
H04	1	(Constant)	0.324	0.007		45.268	0.000		
		Ownership Status (private, public)	0.090	0.004	0.105	21.135	0.000	0.719	1.391
		Facility Type	0.056	0.004	0.074	14.910	0.000	0.719	1.390
		ageBand	0.018	0.000	0.209	49.597	0.000	0.999	1.001
		deprivationID	0.012	0.001	0.076	18.004	0.000	0.998	1.002
H71	1	(Constant)	0.316	0.053		5.991	0.000		
		Ownership Status (private, public)	0.083	0.047	0.027	1.778	0.075	0.891	1.123
		Facility Type	0.130	0.027	0.071	4.738	0.000	0.892	1.121
		ageBand	0.027	0.002	0.224	15.659	0.000	0.990	1.010
		deprivationID	0.017	0.004	0.067	4.714	0.000	0.991	1.009
H80	1	(Constant)	0.341	0.010		34.803	0.000		
		Ownership Status (private, public)	0.106	0.006	0.131	17.192	0.000	0.627	1.595
		Facility Type	0.060	0.006	0.073	9.581	0.000	0.628	1.594
		ageBand	0.018	0.000	0.220	36.377	0.000	0.998	1.002
		deprivationID	0.011	0.001	0.069	11.464	0.000	0.997	1.003
H81	1	(Constant)	0.295	0.013		22.125	0.000		
		Ownership Status (private, public)	0.070	0.009	0.073	7.750	0.000	0.743	1.346
		Facility Type	0.078	0.006	0.120	12.670	0.000	0.742	1.347
		ageBand	0.019	0.001	0.222	27.048	0.000	0.990	1.010
		deprivationID	0.014	0.001	0.093	11.329	0.000	0.989	1.011

a. Dependent Variable: ALOSLOG

Facility type is significant in four out of four regressions, at $p<0.05$, and is positive in all four regressions. Again, because the variable is 0 when the facility is a treatment centre, and 1 when the facility is a hospital, we see that, on average, a hospital is associated with a longer length of stay.

The control variables, age and deprivation, are also significant in all four regressions respectively. The coefficients on age were positive, indicating that a higher age

corresponds to a longer length of stay (as expected). The coefficient on deprivation, a proxy for socio-economic status where 0 is least deprived and 5 was most deprived, was also always positive, indicating that higher levels of deprivation are accompanied by higher ALOS, again as expected.

Broadly, we can say that ownership is an important predictor. In three out of the four cases, ownership is significant ($p<0.05$) and in two out of four cases ownership is the strongest predictor. Facility type (Treatment Centre or Hospital) is a stronger predictor in one case and in one case it is nearly equal with ownership. Again, as we more closely assess cases that are inpatient cases with a longer ALOS, we begin to see significant differences in the coefficients for ownership and facility type. While the control variable of age and income deprivation are generally significant, the size of the coefficient is usually smaller than ownership and facility type, indicating they play a smaller role in determining ALOS than these other factors.

Overall, the model does not appear to be successful in predicting length of stay as there is well over 90% of the variation in length of stay unaccounted for (i.e., predicted by other factors than ownership, facility type, age and deprivation). However, the regression analysis does support the difference in means analysis that ownership indeed is the important difference in performance in terms of efficiency and quality between hospitals and treatment centres. Moreover, the results from the non-logged regression analysis are analogous to the results from the logistic regression analysis (See Appendix H: Regression Analysis for full output analysis).

4.4 Discussion

This section will discuss the overall findings, the key limitations and proposes further research in this area.

4.4.1 Overall Findings

Overall, in the basic descriptive analysis, there is a difference in the ALOS of facilities. The differences are not as strong when assessing the day case rates. Broadly, the data is indicative that ISTCs have better efficiency indicators, followed by Private Hospitals, NHS TCs and then NHS Trust Hospitals. From the quality outcomes standpoint, there is very little difference in the death rates. Readmission rates are lower in the ISTCs. The NHS TCs were slightly better than in the Private Hospitals (by number of procedure areas) with NHS Trust Hospitals having the highest readmission rates within these HRGs.

The difference in means analysis suggests that ISTCs tend to have higher performance levels (as measured by lower ALOS) than all other providers. NHS Trust Hospitals have the lowest performance. IS Providers perform better than NHS TCs. The evidence is even more profound when limited to inpatient cases (and taking out outpatient procedures).

Provider day case rates were also assessed. We see that the day case rates are highest for NHS TCs and NHS Trust Hospitals, followed by ISTCs and then Private Hospitals. However, there are significant limitations to this analysis. Cataracts and arthroscopies account for 90 or more per cent of the total cases. There are significant differences when comparing providers and their number of cases. Lastly, the day case rate only estimates whether the procedure was a day case or not. This dampens the actual range and variance between providers.

As proxies for quality, 30 day death rates and inpatient readmission rates were examined. With respect to 30 day death rates, outcomes were found to be no better, nor worse, by type of provider. The evidence from inpatient readmission rates suggests similar results. Inpatient readmission rates were found to be no better, nor worse, by type of provider. Results are only significant when ISTCs are compared to NHS Trust Hospitals (ISTC < NHS Trust Hospitals).

The ALOS and quality outcome analysis was unadjusted for case mix. As a result, there was concern that differences in case mix may skew the initial findings. As a result, patient age and patient income deprivation, or IMD, were used to assess for these possible differences in case mix. With respect to age, broadly, there is very little difference between the providers. In all comparisons, except for the comparison of IS Providers and NHS Trust Hospitals, the data is statistically insignificant, with the confidence intervals crossing zero.

Further, the initial findings suggest that deprivation scores differ very little between providers. The evidence is only statistically significant when comparing ISTCs and NHS TCs (ISTCs have lower deprivation levels) and when comparing NHS Trust Hospitals with all the other provider types (NHS Trust Hospitals tend to have slightly higher deprivation scores).

The regression analysis was undertaken to assess the strength of these relationships. It is important to reemphasise that the purpose of the analysis is to initiate the hypothesis that there are differences in performance between the Treatment Centres and not to explain causation or prediction, but rather to obtain initial correlations and ensure that there are differences in performance. Broadly, we see that, when significant, ownership is

the strongest predictor in the model, as it tends to have the highest coefficient in the majority of these cases. This evidence is more prevalent when using non-logged ALOS (see Appendix H). We do not see much difference in age nor deprivation that would suggest that there are significant differences in case mix complexity between facility types. As a result, the regression analysis seems to support the difference in means analysis which suggests that ownership is the reason for the difference in performance between treatment centres.

4.4.2 Key Limitations

There are several key limitations to the approach used and the quality of the data. Some of the broader short-comings of the data are discussed in Chapter 3, and as such, this chapter will limit itself to specifically quantitative issues.

Without a doubt, as we have seen above (Chapter 2) there are limitations to using ALOS as a proxy for efficiency. Other potential efficiency components, such as operating room (OR) time, OR's used-per-day versus number of OR's in total, and surgeries per doctor per shift, may be better measures of efficiency. However, this data is not reported to a central NHS database. Attempts to assess individual performance were made through the calculation of staffing numbers alongside volume figures. However, in the end this proved impossible due to the various nature of surgeries and limitations on case mix adjustment, as well as the absence of good staffing data at the ISTCs and NHS facilities. As a result, ALOS has been selected because it is the best indicator available to broadly assess differences in performance, while keeping in mind the previously mentioned limitations. Median and inter-quartile range was cross-checked (see Appendix I: Box Plots). The results are broadly consistent with the findings in this chapter.

The researcher felt that keeping the outliers was important, as it would be difficult to justify where any cut-offs should be. It is clear from the data that there are significant quality issues both with the coding and data reporting. However, we make the assumption that these quality-reporting issues are consistent between providers, and that therefore, they should cancel out when comparing different facilities. Moreover, the median and inter-quartile range provides the ability to cross validate whether the outliers skew the results towards one provider or the other. Clearly, they do not.

Another potential limitation to the findings is that the difference in means analysis between individual HRG comparisons does not account for the number of cases within each provider comparison. For example, there were a total of 4,888 patient cases for HRG

H71 (Revisional Procedures to Hips). Thirty-three (33) of these cases were provided by the ISTCs (0.7%), 130 provided by NHS-Run TCs (2.7%), 4,703 provided by NHS Trust Hospitals (96.2%) and 22 cases provided by Private Hospitals (0.5%). As a result, a comparison between a low number of cases with a lower than expected ALOS by the Private Hospital providers and high number of cases by the NHS Trust Hospitals may result in an unfair comparison.

The lack of comprehensive set performance metrics means that the data does not provide a complete performance picture. It also means that there are gaps and inconsistencies between providers and with respect to the NHS. The quality of the data that is being reported is another potential limitation to the findings (Health Committee 2006; Healthcare Commission 2007; Mason, Miraldo et al. 2007; Pollock and Godden 2008). Evidence of misclassification of cases could have introduced a major distortion into the reported differences. Further, only seven (7) of the 60 NHS TCs are reporting to Dr Fosters. As a result, NHS TC data for the other 53 cases is incorporated statistically into the Trust Hospital data which may significant affect the findings, thereby improving the data (e.g. ALOS, day case rates, etc.) reported by the NHS Trust Hospitals.

Another limitation, and significantly underestimated so far in the general research, is that the majority of NHS Trust Hospitals do not separate out the Trust Hospital discharges vis-à-vis the NHS TC data. This impacts not only the robustness of the NHS TC data but also the quality of the NHS Trust Hospital data. Because the NHS TC data is embedded within the overall Trust data, the evidence from this chapter suggests that NHS Trust Hospital performance is higher than truly the case if NHS TC reported data were to be separated out.

There may be threats to the validity of the data (Robson 1993) with selection bias in the cases. The facilities chosen were facilities deemed operational and reporting to the NHS during the period January 1, 2007 to December 31, 2007. These facilities that were operational may in fact always have better indicators than the facilities not yet open due to their operational know-how. This selection bias would then be in effect for both the ISTCs and NHS-run TCs. As the NHS-run TC program was launched a few years prior to the ISTCs, there may have been a smoothing effect already in place between the respective facilities. Undoubtedly, over time the issue of selection bias will lessen.

A weakness of the HRG methodology at its current status is that the groupings are not refined to account for variations in complexity in the individual patients and total case mix of the respective facilities. There is evidence that case mix is an important

determinant of inter-hospital variation in average cost, utilisation of ancillary services, and mean length of stay (Feldstein 1967; Evans 1971; Evans and Walker 1972; Feldstein and Schuttinga 1977). Unfortunately, an agreed case mix method of adjustment has not been developed in the UK. Researchers have adjusted for case mix using other methods to get around this issue. Case mix complexity in this chapter is taken into account by using age and deprivation.

However, the limitations to the case mix adjustment factor should be recognised. Beyond the operation (HRG) itself, only two types of variables are used for assessing provider case mix (age and deprivation). A recent study of the outcomes of ISTCs and NHS providers comprised of six ISTCs and 20 NHS hospitals and TCs, that took into account nine (9) pre-operative characteristics including age, duration of symptoms (years), socioeconomic status (deprivation score), EQ-5D score, disease-specific score (disease severity), sex, any comorbidities, previous similar surgeries and general health (Brown, et al. 2008). Despite the increase in the number of variables used, the authors still had reservations on whether their research had adequately adjusted their results for case mix due to their risk adjustment models having a poor predictive power.

Furthermore, Brown et al (2008) study recognised limitations on the findings due to the small number of ISTC patients in the study, which is also reflective of this dissertation. The adequacy for any potential case mix adjustment is particularly important given that the sample sizes differ so much between provider types with many more cases in the NHS Trust category than the other three provider types.

However, even given the limitations, it is to be noted that the authors did find differences in case mix between the ISTCs and NHS providers. This was certainly to be expected due to the inherent nature of the contracts. What would have been valuable is if the authors could have separated out the evidence between the NHS hospital providers and TCs to ensure applicable comparisons, as this dissertation attempts to do. In fact the authors group the NHS Trust Hospital and TC providers and compare this to the ISTCs. More pertinent would be to compare the NHS TC providers with the ISTCs because of the same target patient case mix.

There is concern that the TC Programme may also affect quality outcomes. Though, the evidence suggests that ISTCs have lower ALOS, there are may be linkages between ALOS and readmission rates. In this study the research did not track individual patients that were readmitted and hence cannot adjust for this potential limitation. However, the literature on this is discussed in Chapter 2, with the balance of evidence suggesting no

evidence that providers with lower than average lengths of stay for first admission have higher readmission rates.

Multicollinearity between two or more of the predictors presented a major concern. Multicollinearity exists when there is a strong correlation between two or more independent variables in the regression model. In the OLS regression, the individual correlations between different variables were checked, and none had an especially high correlation. The variance inflation factor (VIF) from the coefficients table can be used to assess whether a variable has a strong linear relationship with the other variable(s). All the VIF numbers were around 1, well below the value of 10, which is a value at which to be concerned (See Appendix J).

There was also concern that the model might suffer from heteroscedasticity. This occurs when the variance of the residuals is not constant, but is instead correlated with one or more variables. To test for normality of residuals in the regression analyses, histograms and normal probability plots (P-P Plots) were drawn up and assessed (See Appendix K)[1]. Non-linear relationships between a predictor and the outcome variable are much more predictable using these types of plots. The Histograms show normality in the plots. Broadly, the P-P Plots are acceptable. A straight line in this plot represents a normal distribution and the points represent the observed residuals. Clearly, the residuals are close to a normal distribution.

The above weaknesses, along with those listed in Chapter 3, limits the comparability between the ISTCs, NHS TCs, NHS Trust Hospitals and Private Hospitals from a purely quantitative standpoint. However, it does justify the hypothesis that there are differences in performance between the Treatment Centres. As a result, the qualitative analyses in Chapters 5 and 6 will attempt to ascertain why the evidence suggests ownership is an important explanatory variable in the results.

Additional research should be conducted on the quality outcomes. The analyses that can be drawn from the NHS patient records cannot illustrate the full extent of quality outcomes. The initial findings of the Key Performance Indicators (KPIs), which are reported by the ISTCs to the Central Contract Management Units (CCMU) on a monthly basis, were quite positive. The evidence suggests that there is a robust quality assurance system in place, more ambitious and demanding than that for National Health Service (NHS) organisations. The KPI data to be collected and provided by the ISTCs extends

[1] Note that the histogram for H04 is not included. This is due to insufficient computer memory to complete the graphic. An alternative analysis was conducted with the results showing a normal distribution.

beyond that used by the NHS and early quality monitoring results are encouraging (National Center for Health Outcomes Development 2005). However, KPIs are not reported by the NHS.

Further, the quantitative analysis does not assess potential cost differentials between the various facilities. Cost data are not possible to attain as these are not reported to Dr. Fosters. Further, there are commercial confidentiality reasons for not sharing this information to the public by the ISTCs. Even if this data were attainable, the NHS Trust Hospital and TCs also do not report this information. There has been some work undertaken in ccomparison of annual contract referrals and the value of the contracts (Pollock and Kirkwood 2009). However, a key limitation of this research is that the authors estimate of the cost per patient is based upon the number of these referrals from the total value of the contracts. Ignoring the fact that it is the responsibility of the GPs and PCTs in generating these referrals, it is clear that the ISTCs are nascent facilities, operational ramp up takes time and as a result the cost using this calculation would be quite high in the first months of operations. As a result, additional research in these areas would be welcomed now that nearly all the facilities are operating at high levels of capacity (Le Grand, 2009).

4.5 Conclusions

This chapter provides quantitative evidence on efficiency and quality outcomes within a number of elective care procedures. The purpose of the quantitative analysis is to obtain initial correlations and to test the hypothesis of whether there are differences in performance between the Treatment Centres in England. The ISTCs and NHS TCs have been compared to NHS Trust Hospitals and Independent Sector General Hospital Providers. As measures of efficiency, average length of stay and proportion of day cases have been used as a proxies. Quality outcomes have been measured using hospital death and readmission rates.

Theory suggests that ownership structure should lead to differences in performance. Theory also suggests that facilities with a more focused approach should have better performance. With respect to efficiency, as measured by average length of stay, the evidence suggests this to be true. However, when comparing the proportion of inpatient procedures which were completed in one day, NHS Trust Hospitals and NHS TCs were ranked highest, followed by ISTCs and the Private Hospitals. However, there are significant limitations to this analysis. Cataracts and arthroscopies account for 90 or more

per cent of the total cases. There are significant differences between providers and their number of cases and the actual number of providers. Lastly, the day case rate only estimates whether the procedure was a day case or not. This dampens the actual range and variance between providers.

With respect to quality outcomes, we see very little, if any, differences between the providers. Though, we are not able to say that quality outcomes are better within the ISTCs and NHS TCs, at the same time the data suggests that they do not appear to be worse. Generally speaking, we see that ownership plays a stronger role in determining performance than the type of facility. However, the weighted mean difference analysis does not provide information on the relative weights we should put on the 'type of facility' and 'ownership structure' variables, when evaluating their roles in improving performance. As a result, the researcher conducted basic regression analysis.

The regression model helps clarify this issue. Broadly, we can say ownership is the strongest predictor in the model. In the majority of cases where there is statistical significance, ownership is the strongest predictor. In the cases where type of facility is a stronger predictor, ownership is not significant. In the fourth case, ownership and facility type are nearly equal. Age and deprivation, though usually significant variables, do not have very high coefficients, indicating they are not especially important, at least compared to the type and ownership of a facility.

There are key limitations to the quantitative approach, because of the data available. These limitations could throw the comparability and validity of the findings into question, so the following chapters will attempt to assess from a qualitative standpoint the general evidence found in this chapter. The qualitative approach will look more deeply into the Treatment Centre Programme to further investigate the causes for the differences in performance between the treatment centres and between the different ownership structures.

Notwithstanding the evidence, there are larger policy issues in the assessment of the data. Opponents of the Treatment Centre Programme in England, more specifically the ISTCs, may argue that even though there may be evidence of an increase in technical efficiency, the fragmentation of health service leads to allocative inefficiency through the duplication of services and loss in economies of scope. Thus the net effects to the entire health system are not so clear and are not assessed here.

PART III

The Evidence Reviewed – Qualitative Analysis

Chapter 5

Treatment Centres: Independent Sector and NHS

I cannot say whether things will get better if we change; what I can say is they must change if they are to get better.

G. C. (Georg Christoph) Lichtenberg

5.0 Introduction

This chapter is the first of two chapters that will add to the research literature on England's Treatment Centre Programme by providing qualitative evidence on the differences in performance between the Independent Sector Treatment Centres (ISTC) and NHS Treatment Centres (NHS TCs) and to offer some explanations for these differences. From the evidence provided in the previous chapter, the data indicates that differing performance in terms of efficiency is correlated with private versus public ownership and management. The evidence in these two chapters will be further assessed to ascertain why ownership matters, or, at a minimum, why differences in ownership may account for differences in organisational and operational approach between these facilities. The purpose of this chapter and the next is to explore these relationships that cannot be picked up by quantitative measures.

This chapter assesses the Independent Sector and NHS Treatment Centres. The main emphasis of this work is to review differences in the actual organisational structure and operations of these treatment centres, while the following chapter will examine the effects of ownership structures in ISTCs and NHS TCs. The originality of this research is that unlike much other research, the evidence is assessed by going into the 'black box' of these organisations and assessing why there were differences in performance.

This chapter is divided into four sections. Section 5.1 provides a brief review of the research methodology used for this chapter and the evidence used supporting this analysis. Section 5.2 reviews the evidence found from the qualitative analysis. Section 5.3 discusses the findings in more detail. Section 5.4 provides concluding remarks.

5.1 Research Design and Methodology: Qualitative Case Study Approach

The research methodology in this chapter is a qualitative case study approach. The primary method of qualitative research was conducted through interviews with a number of ISTCs, NHS TCs and NHS Trust Hospitals.

As discussed in Chapter 3, the researcher chose the interview format to allow for asking both closed-ended questions as well as open-ended questions. Closed-ended questions were asked for specific quantifiable questions (e.g. staffing numbers), whereas open-ended questions were used when asking about more politically sensitive issues (e.g. perception of management control over consultants) (Bowling 2005). The semi-structured approach was deemed the most appropriate method of interviewing within this politically sensitive environment. A varied question order allowed for capitalising on the responses made by allowing for the most relevant follow-up question to be asked

The qualitative case study approach is not to be limited solely to confirming the relationships suggested by the quantitative analysis, but is also intended to shed light on the causal relationships concerning the provision of care within treatment centres. The case study approach is appropriate here to understand, not only whether there are differences in the manner in which IS and NHS Treatment Centres operate, but why those differences exist.

5.1.1 Case Studies: Facilities Chosen To Assess

Site visits and interviews were conducted at seven ISTCs and nine NHS TCs in England. This amounted to approximately one-third of the ISTCs that were fully operational at the time and one-quarter of the NHS TCs. Two NHS Trust Hospitals were also visited to differentiate NHS TCs from NHS Trust Hospitals and thus provide a fuller picture. In total, 18 site visits were conducted.

The selection of the case studies was based upon two criteria. First, an ISTC from each of the major groups, or chains, owning and operating the treatment centres in England, was to be interviewed. Second, due to the broad variety of NHS TCs which were in operation, a number from both stand alone, as well as NHS Trust Hospital integrated, were selected as case studies. Finally, the selection of different providers allowed for a broad geographical spread throughout all of England, located in urban as well as rural areas and within a broad array of clinical specialty areas.

The primary method of data collection was the semi-structured interview format (See Appendix B: Interview Questions – Treatment Centres and Hospitals). Site visits and interviews were conducted in 2007 and 2008. The initial interviews were conducted with a consultant of the NHS Elect during two day site visits. These initial interviews provided background so that subsequent interviews with treatment centre staff could be narrowed to the essential issues pertinent to the research. These initial site visits included the two NHS Trust Hospitals. Though the purpose of this qualitative analysis was to assess the evidence for apparent differences found between IS and NHS Treatment Centres, these initial interviews also allowed for comparison of NHS Trust Hospitals with NHS Treatment Centres.

The interviewees were generally with the general manager or the nurse manager within the respective facility. Typically, in the ISTCs the interviews included the general manager accompanied by the finance director or chief medical officer. In general, the NHS TC site visit interviews were with the nurse managers, as this was the highest level manager available within the facility.

The interviews were conducted using a systematic semi-structured approach. The researcher worked out a questionnaire in advance, but modified the order of questions based upon the context of the conversation. This technique permitted a less formal approach, allowing the interviewee, and others individuals that were encountered during the visit, to speak freely (Robson 1993). Furthermore, since many of these questions are deemed politically sensitive, the semi-structured approach allowed for broaching sensitive subjects at appropriate points in the interviews.

The initial interviews were two full day interviews with management and clinical staff. The follow on site visits could last anywhere from 90 minutes to a one-half day. Typically, the site visit would commence with the interview questionnaire, which would on average last 60 minutes followed by a walk through the facility. On a number of occasions, the facility walk through was conducted during the interview to allow for a better understanding on how the facility was organised and operated.

The walk through was also important as it allowed for additional interviews with staff and painted a broader picture. The number of additional interviews varied as this depended on the facility size as well as on the availability of staff. This approach allowed for repeating the interview questions and exploring previous responses in further detail. The interview would conclude with the primary interviewee and follow up with questions not yet answered.

5.2 Evidence

Evidence from the previous chapter suggests that the observed differences in performance are a result of differences in ownership. This section examines whether there are differences between the ISTCs and NHS TCs in their use of technology, organisational methods, staff skill mix and management practices. The next chapter considers whether any such differences ultimately are attributable to differences in ownership or to other explanatory factors.

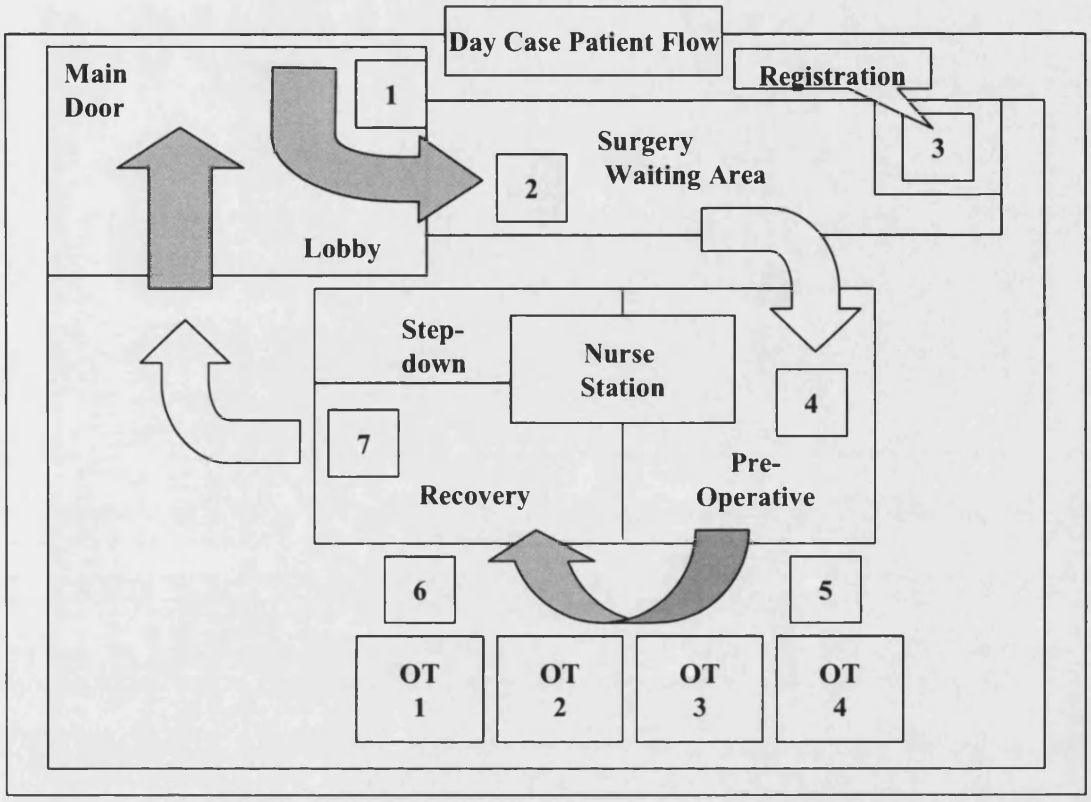
5.2.1 Technology

Technology and how it is used can play an important role in facility performance. From the site visits, the researcher found that there were no great differences in the use of technologies between the independent sector and NHS. However, there were key differences in the location of the technology and how it was purchased, which did impact on facility performance. In general, the ISTCs were found to be technologically integrated. On the other hand, the NHS TCs were not.

An initial, broad description of a treatment centre is necessary to understand the importance of technology within these facilities. There are two main components to the treatment centre, the outpatient clinic and the surgery centre. The outpatient clinic is where the patient is first referred in the treatment centre. The consultant surgeon meets with the patient and then diagnostic images are typically taken (e.g. ultrasound, CT). The consultant reviews the images and makes the final decision based upon the diagnostics and then the patient is preassessed. The pre-assessment, or pre-screening, is to ensure that the patient is appropriate for the facility. This is typically undertaken by nurses. If the patient is deemed appropriate for the treatment centre, the patient is booked for the procedure, which is generally held on a different date. Typically, the initial visit can be undertaken in one visit (one morning or afternoon). However, this necessitates coordination between the pre-assessment nurses, the radiology unit and the consultants within the respective clinical area.

The second main component to the treatment is the surgery centre itself. The diagram below illustrates at the most basic level the lay-out of a treatment centre and the basic operational flow.

Figure 5.1 Day Case Patient Flow



The patient enters the day surgery centre (Step 1). Patients and family members then enter the surgery waiting room, which is designed as a reception area (Step 2). The patient proceeds to registration desk to register for surgery (Step 3). The nurse leads the patient to the pre-operative area, where the patient changes and Intravenous (IV) lines are initiated (Step 4). The circulating nurse or anaesthesiologist guides patients to an operating theatre (Step 5). After surgery, a nurse receives the patient and moves the patient to the recovery unit (Step 6). The patient is then discharged from day surgery (Step 7) and family members meet the patient in the lobby.

PACS System

At all the ISTCs visited a picture archiving and communication systems (PACS) system was in place, where the images could be viewed from many different locations within the facility[1]. The PACS system allows for medical images to be digitised and thus easily stored, retrieved, distributed and presented. PACS systems replace hard-copy means of managing medical images, such as film archives. It expands on the

[1] Two of the ISTCs visited outsourced this function and would have patient scans completed within 1-3 weeks.

possibilities of these conventional systems by providing capabilities for off-site viewing and reporting (distance education, tele-diagnosis). Additionally, it enables practitioners at various physical locations to access the same information simultaneously. With the decreasing price of digital storage, PACS systems provide a growing cost and space advantage over film archives.

The PACS system also helps treatment centres conduct the initial patient visit in one day and enables the information from the preassessment to be readily assessable for the day of surgery. Further, they allow a significant proportion of preassessments to be conducted via the telephone. This allows for increased efficiency, in terms of time, but also has the potential for fewer cancellations.

Unlike the ISTCs, not all of the NHS facilities had PACS capability. Even within those NHS facilities that had this capability the ability to use this technology was not uniform within the facilities. Therefore there was a significant limitation on usage. For example, the site visits found that not all of the consultant assessment rooms had computer monitors or intranet connection to upload the information. Also not all of the operating theatres had a computer screen to view the scans. Therefore many of the x-rays and scans had to be printed. In such cases due to the distance and coordination needs between the hospital and the treatment centre, it was found to be difficult to transfer images back and forth in an efficient and effective manner. This increased the potential for information to go missing or become lost, in turn causing further delays. It is ironic that the ISTCs display better integration, as an important argument by some health economists, as well as those fearing that the ISTC programme, was that the programme would fragment health care delivery, increasing costs. Further, this is consistent with the research literature that found no evidence of economies of scope in health care.

In sum, the ISTCs were found to be technologically integrated, whereas the NHS TCs were not. The main reason for the NHS TCs not being technologically integrated was paradoxically because of the organisational integration with the NHS Trust Hospital. This organisational integration created problems in being able to integrate fully technologically. As a result, organisational integration of the NHS TCs with the NHS Trust Hospitals in fact led to technological disintegration. The facilities would not be fully PACS integrated, resulting in initial patient visits often not being able to be conducted in one day. Further patient information not all being stored digitally and retrievable from multiple locations increased the potential for information to become

lost or missing. The evidence suggests that integration is one potential factor in explaining differences in performance. Integration can possibly affect operational efficiency in multiple ways. Better integration would also suggest that quality should be better. There is less chance for medical errors when patient information is readily available, for instance. Another indicator of quality is patient satisfaction. Patients not having to return to the treatment centre would suggest higher patient satisfaction levels. It is therefore not surprising that the Healthcare Commission (2007) found that patient satisfaction rates within ISTCs were significantly higher than within the NHS.

Consultant Notes

Another important aspect of patient information is the consultant notes, which encompass previous patient history, the diagnostics and the preassessment. Broadly, notes were not an issue in ISTCs. However, in NHS TCs, evidence suggests that consultant notes are a significant issue.

One of the reasons why patient notes was an important issue within the NHS TCs is in relation to the lack of technological integration and digitising the patient information. Most of the notes at the NHS TCs were in a hardcopy format, rather than in softcopy (electronic) format, which necessitated significant coordination. The NHS consultants, whether in the NHS Trust Hospital or NHS TC, stated that their unwillingness to operate without 'notes' was due to patient safety concerns and the potential for liability in the event of a medical error. Due to the NHS consultants' unwillingness to operate without consultant notes and the diagnostics being an important component of notes, any breakdown in the coordination of the notes could lead to cancellations or even medical errors.

The researcher encountered a number of cancellations due to the notes issues, but no evidence has been found that notes-related problems lead to medical errors. That said, fewer patient cancellations suggests not only better performance in terms of efficiency but also better quality. Accessibility of patient notes will lead to a likelihood of fewer medical errors, as well as patients being more satisfied with not encountering the cancellation of a procedure. Whether or not notes-related problems led to medical errors in the NHS TCs, notes were not an issue within the ISTCs visited. Patient information was typically put into the information management systems that the ISTCs had in place. As a result, the pertinent patient information could be found in nearly every part of the treatment centre. The importance of

consultant notes is revisited again in relation to management practices (See Section 5.2.4 Management Practices).

5.2.2 Differing Organisational Methods

A number of organisational aspects were reviewed to assess whether they could engender a significant difference in performance within the facilities. These included the management structure of the facility, the method of consultant reporting, the perception of management's control over consultants, the ability of administrators to incentivise consultants and the role of anaesthetists.

Management Structure

In general, within an ISTC, the interviews found there were four important managerial positions: general manager, medical director, director of nursing, and business office manager. Interviews also found ISTC reporting mechanisms were relatively clear. NHS TCs presented a rather different picture. The staff within the NHS TCs typically reported to management which often had multiple roles within the NHS Trust, of which only one role pertained to the NHS TC. Because of the complexity of the structure, the reporting mechanisms were unclear. The researcher's inability to track down the NHS TC management team is the reason why the majority of interviews in NHS TCs were with nurse managers. The following paragraphs provide specific examples of management structure and reporting mechanisms with the ISTCs and NHS TCs.

In six of the seven ISTC site visits there were four management positions, with ISTC G the lone exception. ISTC G is unique in the fact that it is a shared service with an NHS TC. There the staffing consists only of the operating theatre staff and three administrators. All pre-admission, pre-operation and post-operation functions are carried out by the NHS.

ISTC A was in the process of implementing a horizontal and vertical integration scheme. Prior to implementation of the scheme, a small team was designated for patient care. This team included an occupational therapist, a physiotherapist, a nurse and the respective surgeon. The general manager of ISTC A commented that the *"emphasis was on orthopaedics and therefore physiotherapy played a key role"*. The general manager went on to say that

> *40 per cent of outcomes were a result of the surgery alone, and 60 per cent the result the post-surgery physiotherapy. As a result, intensive post-*

> *surgery collaboration was essential in getting the patient moving so that the patient could be discharged as quickly as possible.*

In only three of the NHS TCs of the nine visited was it clear how many key management positions there were within the facility. This was predominantly because the NHS TC was part of a larger Trust Hospital and there was significant cross staffing and shared responsibilities, as well as recent restructurings.

For example, in NHS TC AA there had been a number of recent lay-offs and the treatment centre manager was one of the recently laid off individuals. As a result of the lay-offs, the reporting scheme was now directed to the NHS Trust Hospital administration. Another issue in NHS TC AA were the four nurse managers. These nurse managers were managers of the treatment centre as well as the general hospital, illustrating the treatment centre/Trust Hospital cross staffing. NHS TC HH had a part-time manager, who was also responsible for two other hospitals. Only at the time of the interview (Spring 2008) is this facility obtaining a dedicated facility manager.

NHS TC II's story provides insight to how a treatment centre's integration with the Trust Hospital affects its operations. According to the general manager, *"it operated as a true treatment centres, but due to the Trust's financial difficulties, the treatment centre was absorbed into the Trust."* The general manager went on to say,

> *the managers were let go or reallocated to other positions to cut costs. However, the Trust recognised that length of stay started increasing in the basket of procedures that they track for the treatment centre. As a result, as well as that the Trust is now doing better financially, NHS TC II is devolving back to its original treatment centre focus.*

There is now one clinical head and a dedicated general manager who has three operations managers and one lead nurse underneath him.

NHS TC BB seemed to be the best in terms of a clear management structure, compared to other NHS TC site visits. The facility was relatively self-contained and isolated from Trust Hospital dynamics. Further, although the Trust was in financial difficulties, it did not have wait list problems.

In general, the interviews found that management in ISTCs was relatively clear, compared to NHS TCs, where departmental structures suffered from unclear reporting mechanisms. This is likely because all NHS TCs visited were part of an NHS Trust with significant cross staffing and shared resources. Furthermore, there have been a number of restructurings in NHS Trust Hospitals, many of which were ongoing at the time of interviews. Moreover, it was not always clear in the NHS whether treatment

centre staff reported to a treatment centre manager or to the NHS Trust Hospital itself, implying the treatment centre was seen merely as another clinical department.

Consultant Reporting

The interviews found that in all seven ISTC case studies consultants reported to the Medical Director, one of the four in the management team. As these organisations are relatively flat, there is less hierarchy, resulting in what appeared to be more individual accountability within the organisations.

Again, the NHS TCs presented a rather different picture. In general, NHS TC consultants report to their clinical department head in the NHS Trust Hospital, who in turn reports to the CMO. In only one of the nine NHS TCs visited was there reporting to a NHS TC medical officer (NHS TC GG), indicating NHS TCs were organised merely as an additional functional area of the NHS Trust Hospital. The exception was the case where the NHS TC was a stand-alone facility. The nurse manager of the facility commented,

> *because we are stand-alone, we have been able to allocate a dedicated consultant to our facility to manage the others."* She went on to say, *"I am not sure if we would have this individual if we were more closely joined [physically] with an NHS Trust Hospital.*

Perception of Management Control

The interviews found that in general within the ISTCs there is a fairly strong perception and attitude that management is in control, with the exception being cases where ISTCs used NHS seconded staff. Conversely, management in the NHS TCs had a much lower perception of control. Though these responses are surprising, they must be understood in the context of how the NHS facility sees itself in comparison to other NHS facilities, not to the actual management control.

In four of the ISTCs management control was deemed high, in two it was deemed good and in one fair. ISTC B stated that they had *"a well-developed, integrated approach and because of this integration, management was in control"*. There may be a few explanations for the lone ISTC which deemed management control of consultants as fair. The manager may have set high expectations as nearly all the indicators showed they were one of the best compared to other ISTCs in terms of KPIs. The respective manager's high expectations were confirmed by follow on interviews within another ISTC with the same shareholder.

Further, the ISTC used primarily Western European consultants. Most of the other ISTCs used a mix of consultants, mostly from Eastern Europe. This suggests a key factor in management control may be the perception of remuneration vis-à-vis the consultant's home country. A substantial raise in salary may drive consultant attitudes and the relationship with the facility. These issues are addressed in section 6.3.5 discussing ownership. Alternatively, it may not just be the financial remuneration, but the aspect of additionality in general.

ISTC D had the unique situation of being adjacent to an NHS TC. As a result of their contract, they had two NHS consultants on secondment. The ISTC management stated *"these physicians most often called in late and missed scheduled lists."* The ISTC was unable to handle the situation effectively because, since they were NHS employees, the ISTC could not use the threat of firing, or the possibility of further financial remuneration to change their behaviour. Similar complaints were voiced by another ISTC using NHS seconded staff. One of the managers commented, if it was his or her full decision, *"I would not bring in an NHS consultant again into the facility"* on secondment because of the inability to change their 'NHS' practices.

At ISTC C, management's level of control was viewed as very good. There were three areas that this facility focused on: general surgery, gynaecology and ophthalmology. General surgery was run by a mix of Western and Eastern European consultants. Gynaecology was run by a consultant of Western European origin and ophthalmology was run by Western European consultants. These consultants had already practiced in their native country in the private sector, using their own techniques. The private clinic that these consultants worked for was bought out by the current parent company some years ago. The general manager stated that

> *the transfer of these consultants from their home country to the UK was merely a transfer in physical location, as the clinical techniques were unchanged. Because of this, these consultants were already set in their ways with respect to the focused approach, making management much easier.*

In the NHS TCs, consultants were employed by the respective Trust hospitals. In seven of the nine cases the perception of consultant control was average, one was good and another was *"no control"*.

That said, the answer to those questions must be viewed in relation to the respondent's reference point, this being their experience in other NHS facilities. Delving deeper into this question, there was a general perception by managers that

"no one is able to tell them [consultants] what to do." One NHS TC nurse manager remarked that the staff certainly had *"trouble controlling them." "Some resent this, even though they are making more than ever before,"* continued the interviewee. The general perception from the consultant standpoint was that they were *"not employees of a specific hospital, but rather employees of the NHS".* This alludes to the absence of any one individual to whom they were accountable.

Procedure cancellations provide a clear example of the lack of accountability within the NHS and the use of financial incentives by the ISTCs. Within the NHS, if there was a clinical cancellation, for whatever reason, there did not appear to be any repercussions for the NHS consultant. This was observed while interviewing for a number of hours in the consultant break-room. There appeared to be more accountability in the ISTCs. At ISTC B, it was said that if a consultant only did two cases in the morning, the administration would say, *"I will only pay you for half a list."* At ISTC C, the ophthalmology consultants were paid on a per case basis and would be rotated through once a week. As a result, if the schedules were not full, while they were visiting, there would be considerable pressure put on the facility administrator. Financial incentives and remuneration will be further discussed in the following sections.

There appeared to be some exogenous factors within the NHS, such as the other important reforms that are concurrently being undertaken. This is clearly being felt at the facility level. At NHS Trust Hospital AAA and its adjacent treatment centre, the nurses stated that there had been a general decline in the ethos of the employees. This was a result of the enormous pressure put upon the hospital and its employees to reduce the wait lists and hit the end of the fiscal year targets. One comment from a nurse manager, who has been within the NHS for quite some time, was quite telling. She said, *"before 1996, we would make the emergency patients wait and do the electives."* In 1996, part of the NHS plan mandated a 4 hour emergency waiting period. *"So, we would make the electives wait. That was the first squeeze. Now with the 18 week patient waiting list, we are being squeezed from both sides."*

There may also be some endogeneity here. The ISTCs were not allowed to hire consultants that had worked for the NHS within the past six months. As a result, most, if not all, of the ISTC consultants were from overseas and there was a clear perception who their employer was. The NHS consultants, on the other hand, work in NHS Trust Hospitals as well as private ones. The contractual role of the NHS consultant between

the NHS and the private hospitals is different and likely to be a key driver to the differing employment mentalities. The resulting differences in this contractual nature are likely to drive differing perceptions of management control.

There are clearly different perceptions of management's level of control between ISTCs and NHS TCs. There was a perception of greater management control in the independent sector. This may be because the ISTCs seemed to have a much more integrative approach between the administration, nurses, surgical consultants and anaesthetist. On the other hand, the interviews found that with the NHS staff there was clear recognition that an integrative approach was needed and an area for much improvement. The perception of management control, or lack thereof, is consistent with the earlier topic of management structure and clear reporting mechanisms. Organisational integration will be discussed in a later section.

Anaesthetists

Anaesthetists play a very important role in health care facilities and an arguably even more important one in treatment centres; some even state that anaesthetists should play the leading role (Douthwaite and Wherry 2004; Douthwaite 2007). The anaesthetists have control over what type and how much anaesthesia is provided to the patient. The choice of appropriate anaesthesia is an important, perhaps the single most important, factor that allows for patients to be discharged on an outpatient or day case basis. Anaesthetists play a unique and independent role in the operating theatre, since there is little overlap in responsibility and accountability with other personnel.

In all the facilities, anaesthetists were employees of the facility. However, the perception of integration, coordination and management control differed. In general, anaesthetists in ISTCs were found to be part of an integrated team. In contrast, in the NHS TCs, anaesthetists were perceived to be practising independently and sometimes somewhat difficult to work with. The interviews suggest that the anaesthetists are territorial, believing specific patients belonged to them.

In six of seven ISTC cases the response was that the anaesthetists generally worked as a team. The one exception concerned ISTC D. Management of ISTC C felt that the reason was that the anaesthetist was an NHS consultant. The general manager at ISTC B commented *"that there was a team approach to patient care and that the anaesthetists led the team"*. Management at ISTC C did not feel so strongly noting *"the anaesthetists had their own clique, which was difficult to break into."*

Nevertheless, management of this facility felt that anaesthetists were more closely integrated into the facility than in the NHS. So the response to this question may be relative to past experience.

At ISTC E, there was only one anaesthetist. This individual was rotated amongst other facilities owned by the parent company to ensure he or she did not lose his or her skills. Further, as the facility was only doing minor procedures, there was little need for more complex anaesthesiology. As a result, there was little discussion on the decision-making of type of anaesthesiology used.

In NHS TCs the response was overwhelmingly that anaesthetists were organised as a team (eight of nine cases), but how they practised in reality told a different story. Some interpretation is needed to show the differences between how anaesthetists practise in the NHS TCs and the ISTCs. This is typified by NHS TC AA. Within this NHS TC, the nurse manager commented, *"each anaesthetist had his or her own choice of anaesthesiology and pain blockers with respect to different procedures."* Further, this individualistic practice was reinforced by the perception that anaesthetists should not be questioned on their medical practices by each other or by other NHS employees. Another NHS TC commented that the anaesthetists *"were their own clique,"* the same word to describe these medical practitioners by one of the ISTCs.

Management within the ISTCs seemed to have better control over practices of the anaesthetists that lead to higher facility performance. For example, at the ISTC B the patient control anaesthesia (PCA) would be shut off at 24 hours post operation. The PCA is a device that allows the patient to self-regulate the level of morphine that is being fed into the IV, increasing patient comfort. However, evidence suggests that leaving patients too long on the PCA slows recovery as the morphine makes patients lethargic and less willing to move out of the recovery bed. Increasingly 'best-practices' point to getting the patients off the PCA as soon as possible, encouraging them to become mobile and thus be discharged from the facility. Another ISTC was attempting to get rid of allowing patients to self-regulate PCAs 24 hours post operation. However, the facility was having difficulty with the anaesthetists over the decision-making on this and what is 'best' for the patient. In none of the NHS facilities did the researcher hear about this practice. The attempts to implement 'best-practices' by ISTCs argues in favour of higher quality at these facilities. Furthermore,

the fact that ISTCs allow patients to go home sooner suggests superior operational performance.

If we compare ISTCs to NHS TCs, it becomes clear that in most cases the NHS has merely transferred the same practices to a different facility. In NHS TC AA all the anaesthetists practised in the NHS Trust Hospital as well as the NHS TC. The reason was that, though the anaesthetists liked not being on call and the regular hours of the NHS TC, they also wanted to keep up their skills by working with the more complex patients in the main hospital. This was stated in a number of the NHS TCs including NHS TC AA and FF. Consequently, the anaesthetists practised in both facilities, indicating practice patterns were the same, whether the patient was a day case for the treatment centre or a long-term hospital patient.

5.2.3 Different Skill Mix in Staff

The interviews attempted to assess whether the skill mixes of staff in ISTCs and NHS TCs were different, and whether this might drive differences in performance. Key aspects of skill mix assessed included staffing ratios, including physician-nurse ratio, type of nurses on staff, and nurse staffing ratio vis-à-vis beds. The role and experience of the consultant was also examined, including average experience in the operating theatre (in years) and the use of different types of consultant staff, including trainees.

Staffing Ratios

In general, there appeared to be less staffing in terms of nursing in ISTCs compared to NHS TCs. The most significant difference in staffing ratios was in the operating theatre. ISTCs are staffed with the same level of consultant surgeons (minus trainees), but in general are staffed with fewer nurses.

Prior to discussing specific ISTC and NHS TC case study examples, a few comments need to be made about staffing ratios. Lower staffing numbers point to two important items directly related to this research. First, lower staffing numbers can lower costs and thereby improve facility performance, but opponents of the ISTC programme point to the potential for lower staffing ratios to lead to lower quality. However, Chapter 4 presented evidence that demonstrates quality outcomes in ISTCs were no less than in the NHS. Patient satisfaction levels are also an important indicator of the perception of quality and the literature provides evidence that patient satisfaction rates are higher in ISTCs than in the NHS (Healthcare Commission 2007;

CBI 2008). It is important to note, though, that no study has been conducted comparing ISTC and NHS TC patient satisfaction levels.

Second, ISTCs are breaking with the tradition that UK medical associations define policy and are unquestioned. The National Association of Theatre Nurses (NATN), now called the Association for Perioperative Practice, recommended guidelines call for four staff members in an operating theatre. These four staff members include two circulating nurses, scrub nurse and an operating department practitioner (ODP), often referred to as an anaesthetic nurse (Association for Perioperative Practice 2007; Douthwaite 2007). The ODP's responsibility is generally to help the anaesthetists; as a result they are often referred to as an anaesthetic nurse. The ODP's tasks are primarily at the beginning and end of a procedure - in the middle there is not much support they provide. Therefore, during long procedures the ODP's are significantly underutilised.

The Royal College of Anaesthetists calls for a trained anaesthetic assistant, or ODP, to be 'available' and on site (Royal College of Anaesthetists; Douthwaite 2007). However, typical staffing in a United States (US) ambulatory surgery centre includes two nurses, a scrub nurse and a circulating nurse. The function of the ODP, which does not exist in the US, is instead provided by the circulating nurse in the initial and final five to ten minutes of a procedure. This is being adapted by ISTCs, many of whom have incorporated US and Canadian practices in the operating theatre.

In all seven ISTCs' cases, there was a physician/nurse staffing ratio of approximately one to four with four nurses in the operating theatre. However, the ISTCs stated that they did not want to deviate too much from UK practices. Nonetheless, there were specific examples of ISTCs questioning the status quo and introducing new practices to the NHS. For example, the general manager at ISTC B said that they *"tended to interpret more widely the term 'available' and 'on-site' with respect to the use of an ODP"* and ISTC B used the ODP for more than one running theatre at a time. At ISTC C, ODP's were used only for specific general surgeries, and there seemed to be fewer innovative practice techniques in place than in other ISTCs visited; however, this may have been because the company had been an existing provider in the UK for quite some time and used existing anaesthetists.

Again, the NHS TCs presented a different picture. In general, site visits found that staffing ratios were higher, with a physician/nurse staffing ratio of approximately one

to five. The number of nurses in the operating theatre varied from three (three cases) to five (one case) or more (two cases)

Specific to staffing mix, two of the NHS TC's interviewed were quite innovative in their operating theatre staffing. NHS TC BB used only one anaesthetist per two operating theatres and used one medical anaesthetist per theatre. The result was significant cost savings, as two anaesthetists cost the same as one anaesthetist and two medical anaesthetists. Medical anaesthetists are trained technicians with an understanding of the functioning and monitoring of the anaesthetic equipment and clinical practice. They provide skilled assistance for the anaesthetist. The facility was attempting to use one anaesthetist and three medical anaesthetists for three operating theatres, but, according to the individual interviewed, this was meeting resistance from the Royal College of Anaesthetists. It was stated that, in Sweden, one anaesthetist for four operating theatres was the norm. A key factor in this resistance was the UK's surplus, rather than shortage, of anaesthetists. Overcoming this barrier is likely to be difficult in the short term.

NHS TC EE was also using a differing mix in the operating theatre. In these operating theatres, there would be two theatre practitioners (trained as scrub and circulating nurses), one unqualified theatre support worker (trained in-house), the consultant surgeon, and one aesthetic practitioner (AP). An anaesthetist split his time between two operating theatres at once. The treatment centre stated the AP's were a new introduction to the facility and this was still very sensitive. The plan was to use up to three AP's per anaesthetist.

NHS TC HH is quite heavily staffed in the pre and post-op, but this is because of its unique status. It was set up as a day surgery centre back in 2002 and as a result, many of the day surgeries, regardless of whether they were conducted in the treatment centre or main hospital, come through the pre and post-operative care unit of the day surgery wing. This method of operating is quite different from the other facilities visited. Because there were no over-night beds, the treatment centre was able to ensure that non-appropriate patients from the hospital were admitted. The treatment centre was quite different from the other NHS TCs visited. Rather than focus on a core set of treatment centre procedures, NHS TC HH does nearly all cases but only on a day-case basis. The nurse manager commented that *"there was a mix of staff from early on and it has taken 5 years to get where we are today."*

Interpreting the use of staff and staffing ratios at the ward level is more difficult. Nurse staffing at the treatment centre wards has less of an impact for elective patients. This is because the treatment centres do not typically have overnight beds or, if they do (e.g. orthopaedic patients), then these beds are within a focused clinical area for relatively short-stay patients (less than 5 days). Moreover, NHS TCs were staffed for treatment centre patients but often saw non-appropriate (e.g. non elective) patients. This made interpreting performance and cost effectiveness and the role nurse staffing played at the ward level more difficult.

In general, the site visits found that ISTCs operated at lower staffing levels than NHS TCs. Though most NHS TCs are practising in the same manner as the Trust Hospitals, there are some examples of NHS TCs experimenting with staffing skill levels, in line with the NHS goal that Treatment Centres bring innovation. However, these examples seem to be isolated cases, and did not represent a systemic shift of practise in the NHS. More often than not, the NHS TC had merely transferred the old ways of working in a Trust Hospital. The evidence suggests differences in performance in terms of efficiency, but there is nothing that would suggest lower quality of care.

Consultant Experience and the Additionality Rule

Initially, some feared ISTCs would poach NHS staff, and negatively impact the goal of increasing the number of consultants practising in England. As a result, the policy of additionality came into effect for the ISTC program. Additionality meant ISTCs were not allowed to hire staff that had worked for the NHS within the past six months (Health Committee 2006), effectively meaning ISTCs had to recruit outside the country to staff appropriately. This has led to fears that ISTC consultant experience may be less than within the NHS TCs.

The interviews results of the research suggests there is a real mix of ISTC consultant experience level and utilisation. In four of the seven case studies, experience was deemed 'high,' meaning they had performed surgeries on their own for many years. In three of the cases, experience was deemed as varied.

Years of experience is one issue, but how the ISTCs used these consultants is another. For example, ISTC B had a number of Eastern European consultants. These consultants could perform surgery on their own in their home country, while, in England, they did more ward service or support work. The respective ISTC would not

allow the consultant surgeons to operate until the treatment centre was comfortable with them working on their own.

At ISTC C, the consultants were primarily from Western Europe, with some of Eastern European origin. Management of the ISTC stated that they were accomplished physicians in their home country and could perform surgeries on their own. All consultants at ISTC C had 12-15 years experience. There were no trainee consultants used, though trainee nurses were used.

Use of consultants in NHS TCs varied in six of the nine cases. In one case the comment was that the consultants were young. The responses to this question were clearly a result of the utilisation of consultant trainees. Some NHS TCs were predominantly staffed with experienced practising consultants from the NHS Trust Hospital, while others used consultant trainees. For example, at NHS TC AA, the researcher spent a number of hours in the operating theatre and observed very little consultant effort. The operation was performed by the senior resident with an observer resident while the consultant checked his emails and used the mobile phone. At one point, the researcher counted ten individuals in the operating room, not including the researcher and another management consultant. Most were some form of consultant or nurse in training. In none of the ISTC operating theatres observed were there ever more than five clinicians at once.

There are two important but interrelated points. First, NHS TCs vary in their use of trainees (or, more generally, of inexperienced consultants). The use of consultant trainees relates back to staffing ratios and costs. The low ISTC staffing level in operating theatres can primarily be attributed to the fact that training programmes were not included in the initial period of the ISTCs programme (Wave 1) (Health Committee 2006). More recently, the ISTCs have begun to provide training opportunities, but it is too soon to assess the impact on productivity and the potential for significant increases in remuneration. As an illustration, for a functional endoscopic sinus (FES) procedure observed at NHS TC AA, the expected time was 2 ½ to 3 hours. It was estimated that the procedure time for a senior consultant would be 1 to 1 ½ hours (Douthwaite 2007). Clearly, training means more time in the operating theatre and use of existing staff is needed. On the other hand, the hospital remuneration for training vis-à-vis the cost of providing this training is unclear. As a result, whether training is a loss-making, or rather a financially lucrative endeavour is unclear.

In general, evidence suggests there is a great variance of experience of consultants used by the ISTCs as well as in NHS TCs. However, there is no general evidence of 'ISTCs practising' with lower skilled consultants than NHS TCs and thereby achieving lower quality results, as some opponents of the ISTC programme have suggested; indeed, if anything, due to the NHS use of trainees, the reverse was the case.

5.2.4 Management Practices

There are various aspects of management practice that make treatment centres different from general hospitals. The operating theatre is where the majority of the treatment centre's capital costs lie, as well as where the revenue generation is performed. In order to maximise throughput, patient selection and discharge practices are essential. How patients are transported to and from the theatre will be discussed, as well as the efficiency gains, permitted by more effective purchasing and materials management. Architectural design and the way it limits what the hospital managers can do to increase operating efficiency will also be briefly discussed. Lastly, the financial incentives that are in place will be assessed.

Operating Theatre Procedures and Time Scheduling

How an operating theatre is run and lists scheduled have an important impact on the treatment centre's overall cost and revenues. Key questions include: How many patients are scheduled in one list? At what time of day should the patients arrive? How far in advance should they be scheduled? Other factors – such as the necessity for consultants to have notes or the right to book patients themselves – can also impact the flow of patients.

In general, ISTCs were much more effective at booking operating rooms to full utilisation. Time slots were booked two weeks in advance, on average. Since consultants were full-time staff expected to run an average of seven surgery lists and three clinical time lists per week, there was little variation in scheduling. NHS TCs, on the other hand, typically schedule patient surgeries the night before. The reasons for the NHS TCs' relatively poor performance are many and include a lack of incentives to ensure patients do not cancel, the utilisation and level of experience of the scheduler and the reliance on physical copies of consultant notes, which may arrive late to the operating theatre or go missing. NHS TCs also need to ensure there

are enough beds following discharge from post-op, taking into account the needs of the NHS Trust Hospital main operating theatre schedule.

Operating Theatre Lists

As discussed in 5.2.2, ISTCs are staffed with the same level of consultant surgeons (minus trainees) as NHS TCs. However, the number of consultants that use an operating room in a given day varies between the independent sector and the NHS. In the NHS, it is rare to have more than two surgeons in an operating theatre during the course of a day, compared to up to five in the independent sector.

This points to an underlying difference in how operating theatre time is booked. The emphasis of the ISTC was to schedule the operating theatre and allocate consultants to the patient. In the NHS, the emphasis appeared to be geared more towards scheduling around the consultant's time. Superficially, this may appear to be a minor difference, but one can infer that assets are more fully utilised when operating theatre use is maximised.

Further complicating scheduling is the fact that some consultants are quicker than others. Booking operating rooms efficiently may actually depend more on knowing how long a consultant takes to perform a procedure than how many procedures a consultant can do in a list (Dexter, Ledolter et al. 2005; McIntosh, Dexter et al. 2006). This implies the role of scheduler is a large one in determining operational efficiency.

To illustrate with specific examples, in ISTC B and ISTC C, there was only one scheduler. These schedulers were well acquainted with the efficiency of consultants and would schedule lists accordingly. ISTC G, due to its unique way of sharing services, used three schedulers from the adjacent NHS TC. It was stated that when the Did Not Attend (DNA) rate increased, staff knew this was because there were pressures from the NHS and schedulers were being pulled off to do other work. Active use of the contract by the ISTC quickly resolved these issues and the DNAs would quickly revert back to normal.

Within nearly all the NHS TCs, the consultants do their own theatre scheduling and, as a result, the NHS TC often does not know the procedure and whether an inpatient bed will be needed in hospital until the day of surgery. This clearly affects the flow of the entire operation of the hospital.

In one of the NHS Trust Hospitals visited the consultants still scheduled patients in their own paper booklet. The comment was that scheduling nurses *"don't have a*

say how consultants book times". The nurse manager went on to say, *"the consultants have this authority."* The information in this booklet would then be transferred into a computer. There are a number of potential problems that may arise from this process. First, the booklet must be retrieved from the physician. Second, the information must be read and typed into the computer system. Third, the physician's booklet must continually be synchronised with the computer system and vice-a-versa. Fourth, there must be continual coordination with the other staff that will be necessary for the operating theatre time. Errors can occur at many stages in this process.

Two of the NHS TCs mentioned that they were moving towards dedicating operating theatre lists to specific procedures, not just clinical specialty areas (e.g. laproscopic-cholestectomies, arthroscopies). Though none of these dedicated operating theatre times had yet been implemented, it shows that the NHS has recognised the focused factory approach and is moving toward increased specialisation, in terms of theatre time scheduling and clinical staffing.

Most schedulers do not have a clinical background so there is a significant amount of clinical input, especially from the nurses, in the scheduling process. Moreover, it takes time for a scheduling team to know how a consultant practices. Schedulers need to understand how much time a given consultant needs for a procedure to know how many patients to book on a list. This is a problem that becomes more severe as the number of schedulers increases.

In all cases (ISTCs and NHS TCs), consultants struggled with their schedulers. Some consultants wanted more patients on a list than what the schedulers perceived as possible during a four-hour list period. Others wanted fewer patients. Either way, appropriate scheduling played an important role in operating theatre throughput efficiency.

From the interviews, it appeared that schedulers in all seven ISTCs had a fairly strong status amongst management. However, in all nine NHS TCs, schedulers were, broadly speaking, not deemed to be an integral part of the facility operation and thus did not receive support from management in the event of a disagreement with a consultant.

Patient Arrival Times

Scheduling patient arrivals also plays an important role in the operational flow of a treatment centre. At ISTC F, the facility does four major joints per day, on average.

The first two patients come the night before, so they are ready to start at eight AM in the morning. The second group (two patients) come that morning. At ISTC B patient admissions are staggered. However, at NHS TC AA patient arrival times are not staggered, and so they arrive in large groups at 7:00am and 12:30pm. There are large queues, since reception staff does not arrive until 7:30 and even larger queues at the time of the interviews, as this was following reception staff lay-offs. Interestingly enough, alongside the NHS TC, there is a self-contained endoscopy unit that was part of the NHS TC. The endoscopy unit staggered admissions in 20-minute intervals. Many of their admissions and discharge practices seemed to be functioning much like a true treatment centre. There were neither cross-staffing nor shared resources within the endoscopy unit of the NHS treatment centre.

The scheduling process also necessitates patient selection. Outpatient and day-case patients are generally done in the mornings. NHS TC AA attempted to do day-case patients in the morning to ensure afternoon discharge, while inpatients were scheduled for the afternoon, since they would have to stay overnight regardless. However, due to non-appropriate patients taking up beds, a significant number of inpatient cases were being cancelled due to lack of bed space.

This was even more important when the period of time between the outpatient clinic visit and the day of surgery was months, even years. Now the 13-week limit between referral and discharge, makes this no longer necessary. However, the NHS traditional approach of the NHS consultants and anaesthetists wanting to see a patient prior to the procedure seems to be a residual practice. Clearly, this is another cultural and behavioural issue the NHS TCs will need to overcome.

ISTC C was cognizant of morning lists running late, which was having the knock-on effect of delaying the start of the afternoon list. The general manager stated

> *we are having list overruns for the morning session which is making the afternoon sessions start late. We are considering having one session all day and just changing staff with no lunch break in the OR.*

If these changes were implemented, the list time would change from four to eight hours. As this proposed theatre scheduling method had not yet been implemented, it was not possible to assess the results.

ISTC C primarily booked four hour lists in the mornings, Monday through Friday, because the facility was only operating at around 40% occupancy at the time of the site visit. The previous month, at the end of the NHS fiscal year, the facility was

operating at 80% occupancy, because the Primary Care Trusts (PCTs) were attempting to hit NHS targets and thus were actively referring patients to the ISTC. There were only six recovery beds and three to four recliners. With limited recovery beds, but fixed staffing costs, the ISTC scheduled ophthalmology patients in one operating theatre, and gynaecology in the other. This was to insure a mix of varied recovery patients, rather than mostly quick and easy cases. If the facility had been operating at full capacity, there would probably have been some operational flow issues if this practice continued. However, at the time this could not be assessed.

Operating Theatre Time Scheduling

How far in advance a schedule is set is also an important part of operational efficiency. In all seven ISTCs, operating theatre time was scheduled weeks in advance. The inverse was found in the NHS TCs. Scheduling was done only days prior in eight of the nine NHS TCs, often the day before. Better planning lowers the need for flexible staffing but also decreases reliance on agency staff, who are more expensive and often deemed limited in their ability to provide support beyond the specific tasks they are assigned.

Consultant Notes

An important, though often overlooked, aspect of operational efficiency is the consultant information needed prior to an operation. This is often referred to as the consultant notes, or 'notes.'

In the ISTCs notes were not an issue since they found preassessment sufficient. ISTCs received patient information from the GP or PCT upon referral, and they would make the appropriate annotations. During the patient's visit he or she would be seen by the consultant surgeon, diagnostics would be undertaken, the surgeon would make the final decision and then the patient would be preassessed. This information would be computerised, giving the consultant easy access to the information on the day of surgery. The process could take up to four hours, but the patient would only have to come in once prior to surgery.

During the site visit at NHS TC AA, 11 patients were to be operated on, but the consultants had only three sets of notes. As NHS consultants are unwilling to operate without notes (see 5.2.1 Technology), eight of the eleven patient surgeries were cancelled. The notes issue tended to override every interview at NHS TC AA. Notes encompass previous patient history, diagnostics and preassessment, so they are an

important part of the physician's pre-surgery review. However, it is important to understand what the consultant actually reviews prior to a procedure. Some of the 'notes' are very large binders a few inches in thickness. In reality, the consultant is merely checking that the operation is necessary and correct. Upon questioning whether the preassessment checklist would be sufficient, one urologist consultant responded it would be sufficient if he *"just wanted to be a technician. But, I don't want to be a technician."* The response demonstrates the significant barriers to modifying existing cultural behaviour that might increase efficiency in this important aspect of facility operations.

In the case of NHS TC EE, the nurse manager commented that, even if the treatment centre did a pre-assessment, the consultants and anaesthetists still require patients to be seen by them the morning of surgery. This resulted in lists not starting on time. The nurse manager went on to say, *"this is every day."*

At NHS TC GG, consultant notes was a big problem two years ago because medical records staff were let go, a similar story to NHS TC AA. The nurse manager commented, *"now the situation is good. Not everything is computerised but we are getting there and there is no longer the issue with patient notes."*

There is also an operational flow issue with notes. The NHS Trust Hospital, of which the treatment centre was a part, had just laid off the staff responsible for attaining the notes prior to a procedure. Since the notes could be located all over the treatment centre, as well as the general hospital, and since there is only one hard copy, there is significant potential for the notes to be misplaced which might affect the operational flow of the facility.

Cancellations also seemed to be a significant problem in the NHS, often because the consultant lacked the patient's notes. Neither the consultants, nor the hospitals are incentivised to ensure that notes are available prior to a surgery, because a cancellation allows for the wait list period to start all over again. Further, there is no negative financial impact on consultants for cancellations (in reality it is less work). The administrator's target is actually improved. In none of the ISTCs visited were cancellations a common phenomenon. This is likely because in the ISTCs all, or nearly all, patient information was in electronic format (the exception generally being referred, wait-listed NHS patients). As a result, this information could be accessed within multiple areas of the facility, including the operating theatre.

Summary

In general, ISTCs were much more effective in booking operating room times to full utilisation than NHS TCs. This is because there are dedicated schedulers, with specific responsibilities, working in consort with the consultants, and time slots are booked in advance. Schedulers with the ISTCs appear to have a much more important say and role in the scheduling of operating theatre time. The NHS TCs, on the other hand, typically schedule patient surgeries the night before and there seems to be poor information flow between the consultants and schedulers with the schedulers having much less influence on booking time. A related component is consultant notes and the importance in the operational flow of the facility. Within the ISTCs, consultant notes do not play so much of a role, this is because they are primarily digitized (See Section 5.2.1) and technologically integrated. As a result, the patient information could be readily retrieved in varying locations of an ISTC. However, within the NHS TCs, notes were primarily still hardcopy. As a consequence, significant coordination was needed to ensure that they were available prior to a procedure. As a result, cancellations seemed to be a significant problem in the NHS as a result of these consultant notes.

These differences suggest that ISTCs would not only have better operational performance but also patient satisfaction levels would be higher. Fewer cancellations would suggest fewer patients would have to return another day to the facility and staggered patient arrival times would allow for a smoothing of operations and minimal queuing time. We often forget that a surgery or potential cancer diagnosis can be a traumatic experience. As a result, differences in how health care is delivered can have an immense effect on the perception of the quality of care. This is consistent with the findings of the Healthcare Commission (2007).

Patient Selection and Admission Practices

The entire business model of a treatment centre revolves around selecting patients that are appropriate for outpatient, day case or short-stay surgery. Certain exclusion criterion (e.g. Body Mass Index or BMI) are used to decide whether to admit.

Though exclusion criteria may vary from facility to facility, generally speaking, the specific criteria are relatively similar, with the emphasis on ensuring that the patient is appropriate for the treatment centre. Upon review, there was very little difference in the patient selection and admission documentation forms in the ISTCs

and NHS TCs. In practice however, ISTCs and NHS TCs differed significantly. In general ISTCs selection criteria closely matched actual patient flows. NHS TCs were less successful. Time and time again, non-appropriate, non-elective patients were admitted through the treatment centre due to pressure from the Trust Hospital.

In all seven of the ISTC cases, appropriate cases were selected according to criteria which were broadly the same (e.g. elective patients within certain procedure areas). In ISTC B, for example, exclusion criteria were actually decided by the PCT. One of the main exclusion criteria was the body mass index. ISTC B performed procedures on patients with a BMI greater than 35 per cent on an exception only basis. The ISTC A and ISTC C facilities went up to a BMI of 40 per cent. ISTC F only did ASA ones and twos (see below), because the facility had been operating at near capacity since day one and thus decided not to go beyond their contractual obligations.

Another important exclusion is the potential use of anaesthetics. The American Society of Anaesthetists (ASA) classification methodology is a grading system designed to categorise physical status, to create a uniform system for statistical analysis. Many human scientific investigations relating to surgery and anaesthesia have used this classification to categorise patients according to their physical fitness for the purpose of audit and statistical analysis. The ASA scale is as follows (American Society of Anaesthesiologists 2007):

1) normal healthy patients;

2) patients with mild systemic disease (Pregnancy, NIDDM, well controlled asthma, well controlled epilepsy);

3) patients with severe systemic disease that is limiting but not incapacitating;

4) patients with incapacitating disease that is a constant threat to life;

5) patients not expecting to live more than 24 hours.

Treatment centres were varied in the type of ASA patients they would see. Decision-making on the ASA would typically be by management, in close coordination with the medical staff. For example, ISTC A and ISTC Cs would do ASA one to 'ASA three stable.' On the other hand, ISTC B would do an 'ASA one stable' to an 'ASA three not stable.' 'ASA 3 not stable' is when the patient has high, but under control, blood pressure.

There were absolute exclusion criteria at ISTC A; for example patients under 18 years old, requiring shoulder or spinal surgery, who were admitted to a hospital in the

previous three months for an acute condition, who had an acute exacerbation of an exiting condition from which they are still recovering and not yet deemed 'stable', or who had known or suspected infection with MRSA were all excluded. At ISTC C, the criteria were similar, with the age being 16 years.

At ISTC A, the facility pre-assessed not only the patient's medical status but also his or her social status, in order to ensure there was support at home, following discharge. The main reason for this policy was that primary grounds for returns to theatre were patients doing what they were not supposed be doing, generally due to the lack of support at home. The emphasis on social status for ISTC A stems from the orthopaedic nature of the facility. The nurse manager said,

> *we realised we would not get a lot of home health...so we provide a lot of education on the front end rather than on the back end...We set expectations in their head. When five days rolls around they know they are going home. We will make arrangements and have help at home when they get there.*

ISTC C had a slightly different approach. Because of an effective pre-assessment process and clear communication with the local PCT, the treatment centre was generally able to provide appropriate patient care and discharge to the community. The general manager commented that, *"transfers have been low because we have been able to educate the community on what we can and cannot do within the treatment centre."*

Clearly, integration with the community PCT is important. NHS TC II provided a comment along the same lines. *"The back-up in the community is just not there,"* said the nurse manager. She went on to say, that *"the treatment centre does nearly all procedures. But things like joints are a problem in getting patients out the door."*

In five of the nine cases, the NHS TCs specifically stated that they were having difficulty in selecting appropriate patients for the facility. This was due to pressures from NHS Trust Hospitals and consultants scheduling patients as they wished.

However, the interviews found that a few NHS TCs were increasingly taking on more complex (up to ASA three unstable) patients. NHS TC II was doing up to ASA fours. At NHS TC AA, exclusion criteria were based on a BMI greater than 40, controlled hypertension (<180 systolic or <100 diastolic dwa), stable angina, evidence of respiratory issues, suspected difficulty with anaesthetics, on-going usage of a number of medications (e.g. MAOI, clopidogrel and ACE I), and haematological disorders (there was no age limit). The ability of the NHS TC to accept such cases

underscore the benefits of having hospital operating theatres and an intensive care unit (ICU) next door, as well as any other support functions needed in of the event of an emergency. Though these cases were the exception rather than the norm, it does suggest that like the ISTCs, the NHS TCs are moving in the direction of accepting more complex elective care patients.

In all the treatment centres, anaesthetists played an important part in the pre-assessment. While the resident medical officer is considered the 'first line of defence,' the 'second line of defence' is the anaesthetist. To determine whether the patient is appropriate for a treatment centre, the risks to the patient under certain anaesthesia, within the various guidelines discussed above, need to be assessed.

An important point of the ISTCs was that all worked off the same pre-assessment forms. However, this is not the case in all of the NHS TCs. For example, in NHS TC BBB the nurse manager commented that *"we cannot get one pre-assessment sheet together. We are having difficulty in having them work together as a team."*

One ISTC had a profound influence on NHS TC GG's patient selection. As ISTC C was contracted to do orthopaedic procedures, the DH (Department of Health)

> *was bombarded with letters from the Royal Colleges that patients were going to die on the streets...because the ISTC just did it and ignored the consultant complaints this opened the door for the NHS TC to begin doing these procedures."* The interviewee went on to say, *"this further reinforced the NHS TC to operate truly as a treatment centre rather than the Trust's intention as a Day Surgery centre and operate merely an extension of the trust.*

Apparently, now the Royal Orthopaedic Hospital is doing their care management program according to the respective ISTC's guidelines.

There is also a qualitative component to patient selection. By selecting the appropriate patient, the treatment centre can control and minimise risks. Further, by not mixing with other types of patients that are meant for the traditional hospital, other risks are minimised (e.g. hospital acquired infections, etc).

In general, there was very little difference between the ISTCs and NHS TCs in patient selection criteria. Where differences were found was in the actual operations of patients flowing through the operating theatre. Time and time again non-appropriate, non-elective patients would be found in the treatment centre. Morning surgeries would have to be cancelled in the treatment centre, as beds were occupied from overflow of the main hospital. The emphasis of the treatment centre is

maximising throughput. However, when one of the aspects of the operational flow of the treatment centre is not available, this stops the flow through the entire treatment centre. The evidence does suggest that the treatment centres were beginning to push the envelope in terms of patient selection criteria. However, these examples are exceptions rather than the rule.

Discharge Practices

There are two important parties responsible for discharge: the provider and the patient. In general, ISTCs were found to be much better at educating the patient and setting patient expectations on the discharge date. NHS TCs were found to be less skilled at setting these expectations. This section will describe both who is responsible for discharge and how the concept of patient education in respective facilities differs.

In six of the seven ISTCs discharge procedures were nurse led on paper and in practice. The exception was the unique example of ISTC G, where the NHS had the actual responsibility of discharging the patient. Even here, the ISTC consultant provided the protocol and criteria for discharge.

ISTC B provides an excellent example of the independent sector's delegation of responsibility for patient discharge and setting patient expectations on discharge date. The primary person responsible for discharging patients at ISTC B was the discharge nurse. When ISTC B first opened, the average length of stay (ALOS) was five (5.0) days[2]. The facility was able to reduce this to 4.8 days during the course of the first 12 months. The chief nurse of the facility stated that "*setting expectations had played a very important role in discharging patients.*" The nurse continued, "*we are trying to change the mentality of putting the responsibility on the patients.*" The facility had a clear case management protocol system in place and told the patient from the beginning they would be discharged in five days time. By educating on the front, rather than the back end, patient expectations were managed early. Moreover, the ISTC expected no home health care for the patient, following discharge. Home health care is very important for patients that have had a major orthopaedic surgery. Typically home health care is supported by the local PCT, but coordination between the ISTC and PCT is essential. To ensure continuity of care with or without the local PCT, the ISTC emphasised to the patient throughout his or her stay that there should

[2] Though ISTCs are for the most part, day case or short stay, some of the ISTCs contracts include orthopedic work (e.g. hip and knee replacements) that demand longer length of stays. This is a case were significant orthopedic work conducted.

be support from family members and friends following discharge. Consequently, on the fifth day, arrangements were in place for discharging and the family home environment was ready.

At ISTC A, the general manager commented that *"it took 6- 8 months to build this relationship with the PCT and social services."* The PCT knows the ISTC will admit only if they have a post-discharge care slot agreement from the PCT. The ISTC is now able to contact the PCT as the patient surgery date becomes set and arrange a package of care that will be carried out upon discharge. The ISTC general manager continued to say that *"the NHS still cannot do this because the PCT didn't trust the providers."* As a result, the PCT would only begin to put a package of care together upon the patient's admittance to the NHS. Putting a package of care together after admittance creates issues of effective discharge planning, as the PCT may not have staff fully available on the anticipated discharge date.

At ISTC A, where 40 per cent of outcomes were a result of surgery alone, and 60 per cent the result of post-surgery physiotherapy, discharge practices were the responsibility of both the nurse and physiotherapist. If the patient was not ready to undertake the necessary physiotherapy or if support mechanisms were not in place there was a danger they would have to be readmitted. To counter this threat, the facility would plan interim care with the discharge coordinator, who works with physiotherapy and social services. Within 48 hours of discharge this is all closely coordinated.

At ISTC C discharge practices were nurse-led. Discharges were not a significant issue for nurses and physicians in this facility, because the case mix of the patients was very low, all day-case patients. The operating theatre worked primarily in mornings to allow patients sufficient time for recovery.

The ISTCs seem to be much better at setting expectations and they would emphasise repeatedly during site visits the most important aspect of their care was patient education and patient expectations. For a given procedure, the patient would be told well in advance of admission the patient care pathway and the expected date of discharge. This would also set the expectation for the family to provide someone to care for the patient in the home environment.

On the other hand, home health provided by a PCT was an expectation under the NHS. NHS TC's and Trust Hospitals tended to educate patients following surgery and

prior to discharge. There were cases where family members went on vacation and, as a result, patients were not discharged in the expected time frame.

In all nine of the NHS TC cases, the protocol was nurse led discharge. However, in practice, in two of the cases there were consultants or physiotherapists that had to sign off as well. For example, at NHS TC AA the lead discharge nurse stated there were two physicians who were still old fashioned and demanded that they determine the appropriate timing of discharge for the patient. These two consultants were accepted as outliers to the general discharge practices. There are cases where ISTCs generate best practices and influence how the NHS TCs discharge their patients. For example, NHS TC HH is now using the same discharge protocols as the adjacent ISTC.

In sum, the review of the discharge sheets among ISTCs and NHS TCs appeared to be quite standardised, with very little difference between the two types of treatment centres. The real difference in the discharge practices is when patient expectations are set, how closely coordinated post-discharge care is coordinated with the home environment and whether home environment support is ensured from the beginning. The ISTCs did better in all of these respects. This was further reinforced in the examples of the PCTs working with the ISTCs in setting discharge dates prior to admission for home support, whereas with the NHS TCs, the PCTs were unwilling to do this until after the patient was admitted. The integration of the PCT into the ISTC care process appears to have resulted in not only better operational flow – since the ISTC has the ability to provide the full contract of care – but also improved quality of care, since patients receive post-discharge care immediately.

Transporting patients to and from the operating theatre

By whom and how patients are transported to and from the operating theatre plays a very important role in treatment centres. In general, ISTCs used differing methods, depending on the treatment centre, for patient transports. On the other hand, the NHS TCs generally relied on porters to transport patients to and from the operating theatre.

In only two of the seven ISTC cases were porters used. This is because the ISTCs were designed as self-contained facilities where patients would be able to walk to the operating theatre and beds were only a few seconds way. At ISTC B this role was carried out by nurses while at ISTC A porters were used to help transport the patients. The porters used were from an outsourced company; the same company that provided

security, parking and catering services. On the other hand, ISTC C was day-case only and did not conduct orthopaedic surgeries. Accordingly, most of the patients were able to walk themselves into the pre-op room. However, due to the footprint of the site, as it was situated on NHS land in between a number of NHS facilities, the ISTC was limited in building out. The operator had to instead build up and, as a result, the operating theatres and pre and post-op facilities were upstairs. Consequently, some patients needed assistance in getting up and down stairs, which was the responsibility of volunteer porters.

NHS TCs presented a different picture. In three of the nine cases NHS TCs used porters. In two of the cases the treatment centre used nurses to assist. However, in five of the nine cases, the NHS TCs were part of the NHS Trust Hospital, meaning often a significant amount of time was needed to transport the patient to the induction room. This implies the real question of not who was moving the patient but the distance between the ward and operating theatre, as well as the mode of transport (see next paragraph). NHS TC AA provides an excellent example. It was estimated that porters at NHS TC AA take ten minutes to get to the ward and ten minutes to return. Though the time to transport patients may seem insignificant, multiplied by the number entering and exiting the operating theatre per day, this time spent quickly multiplies. Further, the distance illustrates just another possibility for a delay.

How patients are transported also plays a very important role in the facilities. At ISTC B patients walk into the operating theatre or, at worst, are put into a wheelchair (which still encourages the patients to stay mobile). At NHS TC AA, patients were wheeled in a bed, which created a perception by the patients that they needed to be taken care of and looked after. This minor point of how patients are transported is important in setting patient expectations. These minor points are impossible to quantify but may play an important role in how a facility operates and how effectively it performs. At NHS TC HH, all patients walked into the theatre.

The transport of patients to and from the operating theatre was dependent on the type of facility. As the ISTCs are relatively small and self-contained facilities, it does not take more than a few minutes to get the patient from the ward to the induction room. In the NHS TCs, as part of the Trust Hospital, there was often a significant amount of time needed to transport the patient to the induction room.

Purchasing and Materials Management

The purchasing and management of consumables plays an important role in any health care facility. For instance, using the same product company allows a treatment centre to negotiate better prices which positively impacts costs and profitability. In a number of procedure areas (e.g. hip and knee replacements) the product amounts to a significant proportion of the total cost of surgery. In all seven cases, the ISTCs stated they were receiving much better prices than the NHS and NHS TCs.

Another benefit of simplified purchasing is the mitigation of delays in purchasing and shipping. It is much easier to coordinate one rather than multiple products for each respective consultant vis-à-vis the number of surgeries scheduled by a procedure. Even after receipt to the facility, the materials management department must coordinate with the operating theatre to ensure that the appropriate product is stocked on the surgical trays. As a result, there are any number of points where having multiple company products creates the potential for hampering effective performance.

To illustrate with examples, at ISTC A, the surgeons were using two hip products from the same company, and only one knee product. The general manager at ISTC A stated firmly that *"our product costs are 40% less than the NHS."* The findings were similar for ISTCs B and G. ISTC F said, *"we decided not to use the NHS purchasing agency because we can get better prices."* At ISTC C, as part of a larger network of facilities, purchasing was done at the corporate level. As a result, there were larger discounts and a larger ability to save. The respective administrator did not know the discounts, as this was dealt with at the corporate level. However, in a follow up interview with the corporate manager of the ISTC, the manager confirmed that the purchasing costs were significantly below the NHS purchase price. ISTC F uses one prosthetic manufacturer because they can get better prices. By attaining better pricing and less waste of products, again the ISTC felt that their costs are significantly lower than the NHS.

In eight of nine NHS TC cases, the facilities purchased from varying product companies. A lone exception was NHS TC HH where the researcher found that the facility was able to get the consultants to use one product company. Even at NHS TC BB, which is deemed one of the best run NHS TCs, 73 different kinds of surgical gloves were ordered in the previous year. The NHS TC has recognised this and was working towards more efficient purchasing and consultant product consolidation. 'We are getting better but we still not as good as an ISTC', the manager commented with

respect to purchasing. NHS TC EE also commented that *"purchasing is getting better. We have good staff...and they are empowered to do this"* One of the key aspects of negotiating with consultants was for them to provide evidence based medicine to prove that their more expensive product was indeed of better quality. The administrator of NHS TC has not had a case where the consultants followed up on this and thus slowly the facility was moving toward using one product company.

Most of the ISTCs were able to get the consultants using the same product company. From the interviews the researcher found it was much harder for the NHS TCs to get consultants to use one product company. Further, it was less clear whether the NHS TC actually had control over purchasing themselves or whether this was a responsibility of the Trust Hospital. As a result, this led not only to cost issues, but also to systemic delays in obtaining materials needed for the treatment centre to maximise operational flow throughout the facility.

Architectural Design

Though the architectural design may not fit within the management practices, this sub-section has been added because of the recognition that this is a major aspect of differentiation between the ISTCs and NHS TCs. Architectural design is an important maximising, or limiting, factor for stream-lining treatment centre operational flow. In general, ISTCs visited were designed for the services in which they won tenders (e.g. elective outpatient and/or inpatient surgeries). Thus, these ISTCs were purpose built and operated on a stand alone basis. However, a number of the NHS TCs visited were poorly designed.

In five of seven of the ISTC cases, the facility was a self-contained unit. In the other two ISTC cases the facilities were part of an existing NHS building. One of the managers of an ISTC commented that *"if the facility is a properly designed facility to sweat the asset"* then they should be more productive.

In only three of the nine NHS TC cases, were facilities standalone. As this meant many of the NHS TCs were either designed to be located in the wing of an existing hospital (four cases) or were renovations of existing facilities (two cases), this may have limited the ability to design appropriately and contributed to the poor design of many NHS TCs. Moreover, the hospital planners and architects chosen did not have experience in designing these types of facilities for the intended purposes, further constraining good design. Finally, design plans have changed through the years and,

as a result, the design has often become a patchwork of various plans for services, until the funding for the 'treatment centre' programme was in place.

In one of the NHS TCs visited, the design plans were for day case patients. These plans were changed over the years by the Trust to include orthopaedic services and then later endoscopy services. The resulting design forced patients to exit the operating theatre by way of the main corridor that all patients, employees and visitors used. The manager of the TC commented that *"architectural planning was very poor."* He went on to say that *"the main reason is that the plans have changed over time."* The interviewee went on to say *"so it became a hodge-podge of plans for services until finally complete."*

In two of the NHS TCs, it was clear that all three of the reasons stated above were factors that led to the existing architectural design.

The ISTCs were purpose built facilities for the contract that was in hand. However, in the NHS, the new treatment centres were not seen as an important and integral aspect of the redesign of the way health care services were to be delivered, but rather an expansion of existing services. Clearly, if the foundation of the treatment centre is its design and the way it is to operate is a limiting factor, then management can only do so much to maximise operational through-put. This was seen time and time again in NHS TCs

5.3 Discussion

There are clear differences between ISTCs and NHS TCs. There are a number of overall conclusions that can be drawn from the analysis. These differences and conclusions can be broadly categorised into four groupings: use of technology; differing organisational methods; different skill mix in staff; and management practices.

5.3.1 Use of Technology

There were differences found in how technology was used between the ISTCs and NHS TCs. ISTCs were found to be technologically integrated, whereas the NHS TCs were not. The main reason for the NHS TCs not being technologically integrated was paradoxically because of the organisational integration with the NHS Trust Hospital. While all six (6) of the ISTCs had diagnostics units technologically and organisationally integrated within their facility, six (6) of nine (9) of the NHS TCs shared diagnostic services with the NHS Trust Hospitals. An example provided is the

use of PACs and how it was, or was not, integrated into patient care. Further, consultant notes were not an issue within the ISTCs visited. This is because patient information was typically put into the information management systems that the ISTCs had in place. Consultant notes was a major issue within the NHS TCs and an important aspect of this was because these notes were not digitised and technologically integrated into the day to day operations of the facilities.

The better use of technology by ISTCs – notably the ready availability in ISTCs of self-contained diagnostic equipment and the move towards digital notes – may yield improved efficiency. Clearly keeping equipment readily available improves efficiency, since staff spends less time travelling, do not have to schedule use of the technology with other departments, and can keep equipment set up specifically for the purposes of the treatment centre. This may be one explanatory factor for the evidence suggesting superior performance of ISTCs in terms of efficiency.

There is also a quality of care element to this integration. Integration suggests a potential for higher quality, as loss of medical records and medical errors would be minimised. It would also suggest that patient satisfaction levels would be higher, since patients spend less time waiting to be moved to the site of diagnostic equipment, or waiting for consultants to find notes. As previously mentioned, this is consistent with the findings of the Healthcare Commission (2007).

5.3.2 Differing Organisational Methods

The interviews found that management structures in ISTCs were relatively streamlined, whereas in NHS TCs, the departmental structures were under the NHS Trust Hospitals. Within the ISTCs, management reporting was clear. But it was not always clear within the NHS whether staff reported to a treatment centre manager or to the NHS Trust Hospital itself, implying that the treatment centre was seen merely as another clinical department.

There are clearly differing perceptions and attitudes toward management control in the different facilities. ISTC staff perceived that management had a higher degree of control than NHS TCs. Also, the evidence suggests there was much more of an integrative approach between the administration, nurses, surgical consultants and anaesthetist. This integration created the ability to incentivise the consultants much better than in NHS TCs.

Again, the perception of integration, coordination and management control over anaesthetists differed between the ISTCs and NHS TCs. ISTCs seemed to have greater control over their anaesthetists than the NHS. The reporting structure of the ISTCs suggests gains to efficiency for several reasons. First, assuming management is incentivised to maximise the efficiency and quality outcomes of the treatment centre, better control over staff would help keep staff incentives in line with management objectives.

Second, since management at ISTCs is dedicated to the task of operating the treatment centre, and is not split between operating the treatment centre and operating a Trust Hospital – as was often the case in the NHS TCs – management was able to completely direct its resources towards maximising the performance of the TC. Finally, the clarity of ISTC reporting structures means staff will be likely to have more clearly defined tasks and goals, and can more easily address problems that arise, since there is a clear hierarchy. These same dynamics are also likely to help boost quality of care. The fact that ISCTs implement 'best-practices' also supports higher quality outcomes and improved efficiency, since patients are able to leave the treatment centre earlier. Earlier exits are also likely to improve patient satisfaction.

5.3.3 Different Skill Mix in Staff

In general, there is less staffing in ISTCs than NHS TCs. Though the treatment centre operational cost data was not assessed, evidence suggests that the ISTC cost structure is lower.

There was concern that ISTCs would use less experienced consultants, but no difference was found between the independent sector and NHS. Given the lack of evidence for a shortfall of experience in ISTCs relative to NHS TCs, we would not expect staff experience to have an effect on quality outcomes. Indeed, we would lean towards the opposite conclusion, that ISTCs may exhibit better quality outcomes since they generally do not make use of consultant trainees, and may have a higher quality staff-mix, even if they have less staff overall.

Maximising the use of a treatment centre's assets depends on how operating theatre time is scheduled. Conflicts between schedulers and consultants were observed in all facilities, but generally ISTCs seemed to make more efficient use of their operating rooms and staff.

5.3.4 Management Practices

Upon review of the patient selection and admission documentation forms from ISTCs and NHS TCs, there was very little difference, but in practice, ISTCs and NHS TCs differed significantly. The overwhelming evidence found that ISTCs were much better at selecting appropriate patients and were much more effective in booking operating rooms to full utilisation. NHS TCs were found mixing non-appropriate patients and practising in the same manner as a general hospital. These differences suggest that ISTCs would not only have better operational performance but also differences in quality. Mixing non-appropriate patients is bad clinical practice which can lead to medical errors as well as the inability to treat patients appropriately if back-up medical support is needed. Fewer cancellations would suggest fewer patients having to return another day to the facility and staggered patient arrival times would allow for a smoothing of operations and not wait in line, suggesting higher patient satisfaction levels.

Discharge practices were relatively similar, both in theory and practice, though ISTCs were more effective at setting patient expectations early as well as having post-discharge care booked. This suggests that due to better ISTC integration with the PCTs, there is not only better operational flow, due to the ability of providing the full continuum of care, but also better quality with patients immediately receiving post-discharge care. It is clear that quality outcomes are heavily dependent on the result of the post-surgery physiotherapy. As a result, post-surgery collaboration with the PCTs is essential so that patients could be discharged as quickly as possible and begin rehabilitation without delay.

Transporting patients to and from the operating theatre is also an important part of ensuring proper flow in and out of the operating theatre and ensuring maximum throughput. Since the ISTCs were relatively small and self-contained facilities, it did not take more than a few minutes to get the patient from the ward to the induction room, but in the NHS TCs, this was not always the case.

Differences were also found in the areas of purchasing and materials management. Most ISTCs were able to get consultants to use the same product company, permitting larger discounts and a greater ability to save on purchasing. NHS TCs had difficulty getting consultants to use the same product company. It was stated in the interviews that purchasing costs at ISTCs were significantly below the NHS purchase price.

Differences were also found in the architectural design of the facilities. The ISTCs visited were designed for the services they were to provide (purpose built). This was not the case in a number of the NHS TCs, and was an important limiting factor in stream-lining TC operations. Furthermore, this physical organisation has an important drawback on the actual operations. Rather than bringing innovation to the NHS, as was the stated goal, there seems to be merely transference of existing organisation structures and the accompanying NHS organisational culture. This is a phenomenon the researcher noted in many instances.

5.3.5 Discussion Summary

Clearly, in all the categories above, there are differences between the ISTCs and NHS TCs. A matrix was created to allow for comparability of the responses vis-à-vis facility type. This matrix also allowed easier assessment of the relationships between the different facility types (See Annex A: Interview Results Matrix – Treatment Centres and Hospitals).

In the use of technology, better integration by ISTCs is suggestive of superior efficiency. To the extent that integrated technology helps ISTCs avoid medical delays and mistakes, technology can also help improve the quality of care and patient satisfaction, relative to NHS TCs.

In organisational methods, the ISTCs were found to have better integration, coordination and management control, all of which are conducive to maximising both efficiency and the quality of care. The ISTCs successful implementation of 'best-practice' is another means by which the ISTCs are likely to improve quality of care and patient satisfaction.

In terms of skill mix, ISTCs and NHS TCs are relatively similar, although ISTCs were, in general, found to have less staff. However, ISTCs were not found to be using less experienced consultants, as had been feared. Accordingly, there is nothing to suggest that different experience levels between NHS TCs and ISTCs will lead to a divergence in the quality of care.

While skill mix was relatively similar, management practices were found to be significantly different. The ISTCs were much better at selecting appropriate patients and were much more effective in booking operating rooms to full utilisation. This contributed to their greater efficiency. Further, the fact that ISTCS were better at selecting appropriate patients, and not mixing non-appropriate patients, suggests that

ISTCs not only have better operational performance but may also exhibit better quality in terms of outcomes and patient satisfaction levels. For example, the process for discharging patients at ISTCs was better integrated with the PCTs than in NHS TCs. This helped patients to receive post-discharge care immediately, which is important for the recovery process.

Differences were also found in the areas of purchasing and materials management, as well as in the architectural design of the facilities – all suggesting higher levels of operational performance.

The qualitative analysis in this chapter outlines reasons why operational efficiency, quality of care, and patient satisfaction might be higher in ISTCs. That ISTCs do indeed exhibit stronger performances in terms of efficiency (as measured by ALOS) is indicated by evidence from the quantitative analysis chapter. Quantitative evidence that quality of care – as measured by death rates and 30 day readmission rates – is superior in ISTCs was not found. However the qualitative evidence in this chapter suggests that there may be significant differences in this area as well.

The differences discussed, however, are not randomly distributed, but arguably determined, at least to some extent, by the impact ownership has on the facility's conventions. The differences between ISTCs and NHS TCs can be broadly collected into four groupings: use of technology; organisational methods; staff skill mix; and management practices. Indeed, the specific, individual differences found in each of the various case studies are discussed under the framework of these four groupings. However, what is important to recognise is that beyond the individual differences found, much of the variation is associated with ownership.

It is not just a question of whether the centre's ownership is private or public and, additionally, how one owner uses technology, organises the facility, allocates staff and manages the facilities. Rather, it is necessary to recognise that ownership has an important impact on the incentive structure, which in turn influences the policies and processes adopted by the facility. The ownership structure drives differences in incentives, as well as motivations and behaviours, since changes in property rights alter the incentives faced by decision makers in the firm. As discussed in the literature review, this is the underlying premise in property rights theory; that changes in property rights alter the structure of incentives faced by decision makers in a firm. There is no reason to believe these effects will not be present in the context of health care.

To the extent that decision-makers face differing incentives, and to the extent that they have the freedom to organise and develop processes in response to those incentives, the organisational model adopted can differ dramatically. This is still the case when the public and private providers are intended to deliver the same service, as in the case of England's treatment centre programme. As argued above, the impacts of a change in the incentive structure can be myriad. In the case of England's Treatment Centres, a divergence of incentives has likely played a role in the observed differences in organisational and operational approaches of the facilities. Because the type of ownership is significantly related to the other differences observed, ownership should be viewed as part of a 'package' that consists of itself as well as the previously delineated individual differences.

The researcher acknowledges, however, that though there are differences in the manner that the ISTCs and NHS TCs are organised and operate, there are certainly larger pressures placed upon the NHS TCs which tend to constrain efforts to insulate the elective work from larger organisational pressures. These are pressures which the ISTCs did not have. Accordingly, it is important to recognise that some of the differences observed are likely to be context-specific. For example, public ownership influences the incentive structure in one way, but a separate issue may be related to the exact policies of the NHS. Some of these pressures include the NHS Trust attempting to meet wait list targets as well as financial pressures within the larger Trust Hospital organisation. To the extent that these policies could be revised, or the NHS TCs could be better insulated from the impact of the policies, changes in the four groupings highlighted may result without a shift in the form of ownership.

5.4 Summary

The main emphasis of this chapter has been to review differences in the actual organisational structure and operations between ISTCs and NHS TCs. The originality of this research is that unlike many economic papers, the evidence was assessed by going into the 'black box' of these organisations and assessing why there were differences in performance.

Though the evidence by its nature cannot be conclusive, differences in the organisational and management practices in the ISTC and NHS TCs that affect performance suggest that there is a clear divergence in operating practice between the ISTCs and NHS TCs. The next question is why? Answering this question is the task of the next chapter.

Annex A: Interview Results Matrix – Treatment Centres and Hospitals

		ISTCs						
		ISTC A	**ISTC B**	**ISTC C**	**ISTC D**	**ISTC E**	**ISTC F**	**ISTC G**
Technology	Different Procedures/Techniques	No	No	No	No	No	No	No
	Diagnostics	Self-Contained. Labs and pharma outsourced to trust	Self-Contained	Self-Contained	Self-Contained	Self-Contained	Outsource CT/MRI who come by in a mobile truck one day a week.	Outsource to neighboring hospital.
Organizational Methods	Management Structure	4	4	4	4	4	4	3 (shared services with NHS)
	Physician Reporting	CMO	CMO	CMO	CMO	CMO	CMO	The only employees are in the OT.
	Management Control	Fair	High	High	Good	Good	High	High
	Incentives	Yes	Yes	Yes		Yes	Yes	Yes
	Anesthesiologists organized	Team. Employee.	Team. Employee	Team. Employee	NHS Consultant	Team. Employee	Team. Employee	Team. Employee
Skill Mix	Physician/Nurse Ratio	¼ +	¼	¼	¼ +	¼	¼	¼
	Nurses in OR	4	4	4	4	4	4	4
	Type of Consultant Staff	Varies	Varies	Varies	Varies	Varies	Varies	Varies
	Consultant Trainees	No	No	No	No	No	No	No
	OR Staff mix/make-up	¼ only 1 nurse	¼	¼	¼ + shared ODP	¼	¼ + ODP	1/6 (1+ than NHS). This is because they do not have any backup staff outside of the OR.
	Avg years experience of consultant in OR	High	Varies	High	Varies	Varies	High	High

	OR Time Scheduling	Consultants are to work 7 theatre sessions and 3 clinical sessions. A list is 4 hours.		Scheduler (1 will be 2)	8 hours lists. Tried to book list by day. 2-3 weeks on and 1 week off. No OP requirement.	4 hour lists	Physicians work 4 days a week all day. Plan 8am – 5pm but if finish early then they are finished for the day. Debating whether to add a evening list 5:30 – 9:30 and work on Saturdays.	Considering adding 3rd session every day (5:30-9:30pm) and Saturdays.
Management Practices	Block scheduling of physician time	Yes	Yes	Yes. 7 OR lists/week	Yes	Yes	No	No
	Parallel theatres	No	No	No	No	No	No	No
	How are patients selected?	ASA scores, social exclusions. No BMI limit	1-3 or stable 4 ASA	1-3. 3 stable. Look at socio as well	ASA stable 3 and 18+ years. BMI assessed on a patient basis.	ASA scores – only select 1-3.	ASA 1-2. Don't need to do ASA 3's because they have been at capacity since day one.	ASA 1-3.
	Discharge practices?	Nurse led. Physiotherapist	Nurse led	Nurse/Physiotherapist	Nurse led	Nurse led	Nurse led	NHS nurse led but ISTC consultant has provided discharge protocol/criteria.
	Role of porters	Outsourced.	None	Yes. Outsourced company.	No. Walk with assist of nurse		No.	Use own staff b/c did not want to rely on NHS.
	Are there specific physician incentive structures?	Yes	Yes	Yes. To be a fixed and variable component.	No		No	Yes. 2 types.
Financial Incentive Structures	How structured?	Financial. Company incentive scheme. Based upon KPI quality indicators.	By volume	KPIs	N/A		N/A	1) 1 surgeon is self-employed – paid session rate + paid by going over and above (e.g. 3 procedures instead of 2 per session). 2) Company incentive scheme. Based upon KPI quality indicators.
	Incentive structures in place non-consultant physicians?	Yes	No	No	No		No.	Yes
	General perception of these financial incentive structures	Good	Good	Not yet implemented. Likely poor.	Good		Under discussion.	Good

		NHS TCs								
		NHS TC AA	**NHS TC BB**	**NHS TC CC**	**NHS TC DD**	**NHS TC EE**	**NHS TC FF**	**NHS TC GG**	**NHS TC HH**	**NHS TC II**
Technology	Different Procedures/ Techniques	No	No	No	No	No	No	No	No	No
	Diagnostics	Part of Hospital	Self-Contained	Self-Contained	Self-Contained	Part of Hospital	Part of Hospital	No. Have a CT and MRI (mobile) one week per month. Also MRI in sister hospitals. Wait time is 6-8 weeks while adjacent ISTC wait time is 1-3 weeks.	Use the main hospital's diagnostics. Also, there is a Independent Sector mobile diagnostics unit that comes in every 2 weeks	Use main hospital's. IS mobile lithotripsy unit comes once a month.
Organizational Methods	Management Structure	Unclear. Part of Trust. Never TC focused	Unclear. Some cross-staffing	4. Self-contained	Unclear. Some cross-staffing	Part of Trust. Never TC focused	Unclear. Part of Trust. Never TC focused	Previously, hospital director shuttling between 3 hospitals (so 1/3rd time dedicated). Now have dedicated manager	3 nurse managers report to head of theatres	There is a general manager, clinical director. Under the GM there are 3 operations managers and one lead nurse.
	Physician Reporting	Unclear	To hospital department heads	Medical Director	Unclear	Unclear	To hospital department heads	RMO. Case mix is increasing so need to have a doctor on site.	To hospital department heads	To hospital department heads
	Management Control	None	Average	Average	Average	Average	Average	Good. Because coming from outside and thus seen as contractors	Average	Average
	Incentives	Yes to do another list but no link between utilization and efficiency	Yes	No	No	Yes	No	No	No	No
	Anesthesiologists organized	Self-contained	Team. Employee	Team. Employee	Team. Employee	Team. Employee	Team. Employee	Team. Employee	Team. Employee	Team. Employee
Staffing	Physician/Nurse	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/5	N/A

	Ratio									
	Nurses in OR	5+	3		4	3+	3	5	5+	N/A
	Type of Consultant Staff	Varies	Varies	Varies	Varies	Young	Varies	Varies	Varies	N/A
	Consultant Trainees	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes. Use them very much.	N/A
	OR Staff mix/make-up	1/5+	1/5+	1/5+	1/5+	1/5+	1/5+	1/5+	1/5+	N/A
	Avg years experience of consultant in OR	Mix. ENT procedures being led by high ranking resident while consultant checks hotmail/mobile.	Varies	Varies	Varies	Young	Varies	Varies	Varies	N/A
	OR Time Scheduling	5 different people. Physician focused not OR focused.	Scheduling is based upon demand. Let consultants decide.	Lists (4-8 hours)	4 Hour lists.	Moving toward 'greenlists' Common characteristics include: the same number and type of cases; the same Theatre Team; patients have fulfilled pre-assessment criteria; etc.	3 types of scheduling: - all day – 8:30 – 4:30 - ½ day – 8:30-12:30, 1:30-5 - Evening – 5pm-7pm – only ortho for this. No private patients	2 times 3 ½ hour sessions. Adjacent ISTC has 2 times 4 hour sessions.	9:00-12:30; 1:30-5:00. 2 lists of 3 ½ hours and occasional/ few Saturdays.	9:00-12:30; 1:30-5:00. 2 lists of 3 ½ hours. Used to do nights but too costly.
Management Practices	Block scheduling of physician time	Some	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes. But shifting to clinical scheduling rather than consultant scheduling.
	Parallel theatres	No	No	No	No	No	No	No	No	No
	How are patients selected?	Preassessment for Ortho and TC	ASA. Getting better at selecting appropriate patients.	ASA	ASA	ASA. But cannot control who is admitted b/c of Trust Hospital.	All patients added to the wait list are screened prior. First high level 5 questions. Weed out ASA 1-2. 2nd stage then for ASA 3-5. All done	Using ISTC patient selection criteria. BMI <40. Only did ASA 1-2's and now starting to do ASA 3s. Increasingly doing more complex	ASA 1-3 even 3 unstable.	ASA 4s.

							same day whether fit accordingly to protocols.	patients.		
	Discharge practices?	Nurse but some still are physician led (old school)	Nurse led	Nurse/Physiotherapist	Nurse led	Nurse led	Nurse led	Nurse led. Using ISTC discharge protocols	Nurse led	Nurse led
	Role of porters	Yes. Poor.	Scrub nurses who undertake multiple tasks	Yes	Yes	Use theatre support not porters	Don't use porter model but use operating department support assistant who has additional duties such as prepping the patient.	No	Only 1 after 5 years of operations. For the endoscopy unit.	Yes. Good.
	Are there specific physician incentive structures?	Yes	Yes	No	No	Yes	No	No	No	No except for Bariatric Surgery. JV with Chambers.
Financial Incentive Structures	How structured?	By extra hours/list	Private patients allowed	No	N/A	Private patients allowed	N/A	N/A	N/A	By procedure
	Incentive structures in place non-consultant physicians?	Yes. No flex scheduling.	Yes. Theatre staff. 1% of cost savings	No	No	Staff retention payment. Housing support	No	No	No	No.
	General perception of these financial incentive structures	Good	Good		N/A	Good	N/A	N/A	N/A	Good because lucrative.

Chapter 6

Does Ownership Matter?

Any change, even a change for the better, is always accompanied by drawbacks and discomforts.

Arnold Bennett, "The Arnold Bennett Calendar"

6.0 Introduction

This chapter is the second of two that addresses the differing performance of England's Independent Sector Treatment Centres (ISTCs) and NHS Treatment Centres (NHS TCs) using qualitative evidence. The quantitative analysis of Chapter 4 indicated that better efficiency and quality outcomes were associated with private, rather than public, ownership and management, and Chapter 5 applied qualitative analysis in an attempt to open up the 'black box' of institutions and explain the divergence of outcomes. Technology, organisational methods, staff skill mix, and management practices differences were identified as the likely proximate factors that explained the differences. This chapter takes the argument a step further by trying to identify the causes of those differences – and in particular to explore the role of ownership. In this way, it is hoped the tangled correlations identified in the quantitative results can be unraveled and genuine insight into the causal relationships found.

This chapter is divided into five sections. Section 6.1 provides a brief overview of ownership within the context of this dissertation. Section 6.2 describes in more detail the research methodology used for this chapter and the evidence used supporting this analysis. Section 6.3 reviews the evidence found from the qualitative analysis. Section 6.4 discusses the findings in more detail and addresses some key limitations. Section 6.5 provides concluding remarks.

6.1 Ownership: Overview

Governments are increasingly contracting with the private sector for health care services and England is no exception. The NHS, historically an almost exclusively

public sector enterprise is now contracting with the private sector, commonly referred to as the independent sector, more and more. The independent sector was expected eventually to provide nearly 10 per cent of all elective surgeries for England's NHS patients, the majority of which would be delivered through the ISTC programme (Health Committee 2006). It is therefore important to determine whether the performance levels of the independent sector are higher than public sector entities and, if so, whether the NHS should increase the potential role of the private sector in health care service provision.

Whether or not privatisation actually leads to an improvement in performance has been the subject of a considerable amount of theoretical and empirical research. The literature review has demonstrated that efficiency and the incentives within each firm are not solely dependent on changes in ownership structure. Efficiency and incentives also depend on the level of competition and the regulatory environment in which a given firm operates. Caves and Christensen (1980) have argued that public ownership is not inherently less efficient than private ownership. Rather differences in efficiency levels can stem from a lack of effective competition in the market rather than from public ownership itself. Vickers and Yarrow (1988) even argue that the degree of competition and the effectiveness of regulatory policy typically have larger effects on performance than ownership. Therefore policy-makers must assess ownership in conjunction with the level of competition and regulation in the market.

Accordingly, in assessing the organisational and managerial differences between ISTCs and NHS TCs, we will also examine various other potential variables that may account for these differences and the associated differences in performance. Only by eliminating all the other potential confounding factors, can we determine whether differences in ownership, as theory predicts, do have significant effects on treatment centre behaviour and performance.

6.2 Research Design and Methodology: Qualitative Case Study Approach

The research methodology in this chapter is a qualitative case study approach. The primary method of qualitative research was interviews with a number of ISTCs, NHS TCs and NHS Trust Hospitals in England.

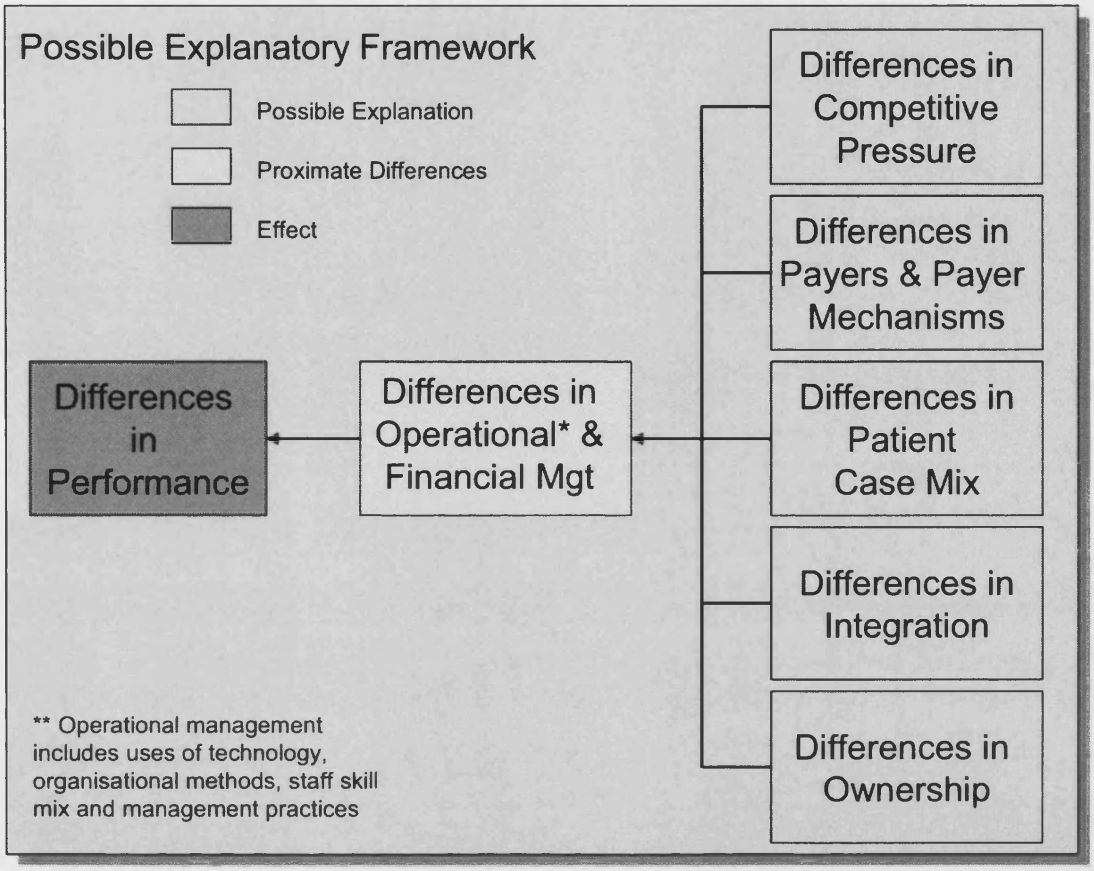
This chapter follows the previous one in assessing the differences in Treatment Centres in England. The approach of this chapter is to use the same qualitative data,

but from an ownership perspective. This approach is not intended solely to confirm the suggested relationships, but also to shed light on the relationships in the provision of care by ownership. The case study approach is appropriate in this case to understand not only if ownership matters, but also, if so, how and why it does - specifically how and why it contributes to the ISTCs exhibiting higher efficiency and quality.

6.3 Evidence

There are a number of potential explanatory variables that must be discounted before it can be asserted that ownership is indeed the primary explanatory variable for differences in performance. Other explanatory variables that could account for the differences in performance are competition, type of payer and method of reimbursement, case mix selection, physical and organisational integration and differences in ownership. The graphic below provides a summary of the potential explanatory variable for differences in performance which will be discussed in the following sections.

Figure 6.1 Possible Explanatory Framework



6.3.1 Competition

Efficiency and incentives in a market often depend on the level of competition in the environment in which a given firm operates. A key lesson from the conservative government's internal market reforms of the 1990s to the NHS was that incentives must be sufficiently strong before providers actually change their behaviour (Le Grand, Mays et al. 1998; Le Grand 1999). The failure of the reforms to achieve their goals was due to the weakness of the internal market's incentives. Consequently, the view emerged that the healthcare system needed a competitive market for the entire health delivery system, in addition to an expansion of capacity (Commercial Directorate 2005; Anderson 2006). These two goals are seen to be mutually reinforcing, since a competitive market would add capacity and added capacity would create a competitive market.

The level of competition is important to consider as it can be argued that public ownership is not inherently less efficient than private ownership if the differences in efficiency levels stem from a lack of effective competition in the market rather than

public ownership itself. Therefore, competition could be an alternative explanatory variable for the difference between Treatment Centres in England.

There are three ways in which competition could affect differences in performance between ISTCs and NHS TCs. First, there could be direct competition for the same service between them. Second, there could be indirect competition, or peer effects. Third, there could be no direct or indirect competition between the treatment centres (IS or NHS), but there could be differences in the competitive pressure they face from other sources – in particular, from NHS Trust hospitals.

It is worth noting that although each of these types of competition could affect performance, they will not necessarily all go in the same direction. If the theory is correct, direct or indirect competition between ISTCs and NHS TCs is more likely to lead to an equalisation of performance between them rather than creating differences in performance. Only if ISTCs were subject to more competitive pressure than NHS TCs from any other source would this lead to differences in performance.

Competition: Quantitative Case Studies

A geographical analysis was conducted using NHS patient discharge records to assess the extent of competition for ISTCs and NHS TCs (See graphic below). A key indicator of competition is the number of firms within a market area. This implies that, to measure competition, the market area's size and boundaries must be determined. One of the main strategies used is to identify a geographic market area. Standard geographic market areas can be based on political boundaries like counties or Strategic Health Authorities (SHA's). With geographic market area defined for each firm, the set of competitors can be established by simply identifying all potential competitors whose market areas overlap with the market area of the firm in question. However, if an area is too small relevant competitors will be excluded, while if an area is too large, unrealistic market competitors will be included (Baker 2001).

One way to improve on the use of the geographic area strategy is to define an area of a fixed size around each firm to be the geographic market. One common method is to draw a fixed radius of some length around each firm. In studies of hospitals, for example, researchers have considered geographic markets with radii ranging from 15 miles (Robinson and Luft 1985) to 35 miles (Kessler and McClellan 2000; Kessler and Geppert 2005). However, hospitals in rural areas may compete over larger

distances than urban hospitals, but fixed radius market areas assume the same radius for both.

Initial analyses included the fixed geographic market strategy using a 20 mile radius for each ISTC and NHS TC in England. However, it was determined that too many providers would come into the competition area in London (e.g. >50) and too few outside London (e.g. 0). Therefore, a variable methodology was used, following an analysis of the catchment areas. It was determined that a 10 mile radius would be used for London and a 30 mile radius for the rest of England (note that the graphic below only shows 30 mile radii). The red dots demarcate the ISTC sites, and the green dots the NHS Trusts and NHS TCs (See Appendix M for table showing total number of providers per each competition area).

Figure 6.2 Competition Mapping

The postcodes and the latitude and longitudes (lat-longs) were extracted using Mapquest Business Software. With these lat-longs, this data were incorporated into Arcview, a mapping software, and the service catchments radii drawn out. The types of procedures offered by facilities in a given competitive area were then assessed to delineate the 'service area'. The assumption was that individuals are potential patients of any NHS Trust Hospital or NHS TC that offers the same services as the ISTC in whose service catchment they fall.

From the analysis, using the methodology as stated above, it is clear that virtually none of the ISTCs directly compete with NHS TCs. For the most part, ISTCs have been situated in areas outside of major cities, whereas the NHS TCs are situated in and around major cities. The only instance from the research where an ISTC competes directly with an NHS TC would be ISTC D and NHS TC GG; this is discussed further in the next section.

If there is competition, then it is ISTCs that compete against NHS Trust Hospitals. This was, in fact, what was intended to happen (Anderson 2007). At present, anecdotal evidence suggests that ISTCs have had a significant effect on the behaviour of NHS Trust Hospitals (e.g. changing the types of services they provide). However, the one year cross sectional analysis cannot tell us whether ALOS is changing as a result of the introduction of the ISTCs.

We can also assess the number of competitors in a competition area. On average, there were 9 competitors in a competition area for an ISTC and 17 competitors in an NHS TC competition area. With nearly two times as many competitors, we can assume that if there was competition, then the respective NHS TC market areas would be much more competitive.

In any case, there is nothing to suggest ISTCs and NHS TCs face significantly different competition, even if they do not compete against each other, such that it could explain the differences found in the performance of NHS TCs and ISTCs. Indeed, for the most part, ISTCs have been situated in areas outside of major cities. For example, none of the ISTCs have been situated in the London Strategic Health Authority (SHA) where there is a very high concentration of competitors. This is in contrast to 8 out of 27 of the NHS TCs being situated in the London SHA. Therefore, ISTCs should in fact face less competition than the NHS TCs.

Competition: Qualitative Case Studies

From the site visits conducted, the only instance where there may be some competition between an ISTC and an NHS TC was ISTC D and NHS TC GG. However, there is little overlap in the specialty areas between the two providers, which are co-located within the same facility. The one exception is orthopaedic surgery. However, even here the NHS TC did not undertake any major inpatient procedures (such as joint replacement surgeries) until the last few months of 2007, further reducing the potential overlap of procedure areas offered by the ISTC and

NHS TC. As a result, there was very little, if any direct competition between the two facilities during the period for which data was collected (March 2008).

It can be argued, however, that indirect competition, or peer effects, did take place, and this can be an important determinant of hospitals' efficiency (Baumol, Panzar et al. 1982; Iglehart 2005; Bian and Morrisey 2006). Ferrier and Valdmanis (2005) provide evidence that the more efficient a hospital, the greater the average efficiency of its peers.

In this case, from the assessment, there was no perception that the ISTC competed with the NHS TC. However, it is important to note that there was a perception, commonly recognised by both facilities, that the performance of the ISTC was higher. As a result, there was a perceived effect of the ISTC on the NHS TC. The NHS TC stated that its performance had risen in response to the peer effects of the adjacent ISTC. It would have been desirable to check this statement alongside the actual performance of the TCs over time. Unfortunately there were various data complications that prevent this. For instance, Kidderminster ISTC was reporting some cases to the NHS TC site code.

Further, the NHS TC felt that they would not have been allowed to undertake a number of major joint procedures if the ISTC had not broken down barriers with the consultants and Royal College of Orthopaedics. The ISTC manager stated

> *if the TC was working 25% correctly, this would have a positive influence on the other 3 OTs[operating theatres] run by the TC.*[1]

NHS TC GG was increasingly taking on more complex patients, even doing ASA 3 unstable patients, after starting with only ASA 1's and 2's. The NHS TC was also undertaking more complex procedures such as joint replacements. This is a direct result of the adjacent ISTC performing these same procedures, even while the Royal College of Orthopaedics complained about patient safety and quality of care. The ISTC was thus able to break the monopoly of the British consultants' influence over what could and could not be undertaken in treatment centres and hospitals. As a result, the respective ISTC has had a strong influence on the confidence and ability of the NHS TC increasingly to take on more complex patients and procedures, which the evidence suggest they would not have done on their own.

[1] This reflected the fact that the ISTC operated one operating theatre, while the NHS TC operated the other three.

In short, both, the quantitative and qualitative case study evidence suggest that competition cannot explain differences in performance. The quantitative evidence suggests that there is very little, if any overlap and, there is nothing to suggest ISTCs and NHS TCs face significantly different competition. The qualitative evidence suggest that there was only one case found where competition between an ISTC and an NHS TC took place, and in this case there was still very little overlap in procedures. There may have been a peer effect, but this would have brought about an equalisation of performance and therefore could not explain a difference.

6.3.2 Payment Methodology

An alternative explanation for the differing performances could be that there are varying payers or differences in the method of payment to the respective providers. Differing funding arrangements or structures of flows from the funder, or payer, to the provider could create different incentives, which could in turn explain differences in performance (rather than ownership).

Of these possibilities, varying payers cannot be an alternative explanation since English NHS patients are generally the payers for both types of facilities. ISTCs are exclusively for NHS patients and in none of the cases studied were there private insured patients in the ISTC facilities. Private patients do make use of NHS facilities, and it is therefore possible they were treated in NHS TCs. Indeed, the interviews suggested that in some of the NHS TC cases there were attempts to attain additional revenues from private patients. However, these were minimal. More importantly, such private patients would not be considered as NHS patients and their patient discharge records would therefore not have been reported to the dataset used.

Differences in the method of payment are another potential explanation for differences in performance. The NHS focus on 'outputs', of which one important component is the HRG system (Payment by Results), is an important and related component in contracting with the independent sector. In the past, the method of purchasing was primarily budget-based, without an emphasis on performance. Government policy is that gradually all providers will be paid on the Payment by Results methodology, which will ensure a level playing field.

However, the Wave 1 tenders for the ISTCs were based upon five year guaranteed revenue contracts at a higher than tariff price to encourage new market entrants in England. The Parliamentary Report pointed out that the ISTC tariff price was on

average 11.2% above the NHS Equivalent Cost[2], though lower than the historical 'spot–purchasing' price in which was thought to be in excess of 40% of the NHS Tariff (Health Committee 2006). Effectively, this payment is a fixed budget methodology with some penalty charges incurred if the ISTCs' contractual obligations are not fulfilled. The premium in the tariff price was to attract new market entrants to the sector. NHS Trust Hospitals are paid on a budget methodology as well, with the NHS Trusts then allocating a budget to the respective Treatment Centres. In effect, the incentives work in the opposite direction, encouraging inefficiency. Based on the superior performance of all treatment centres over the trust hospitals, clearly, this is not the case.

Some could argue that the ISTCs have an unfair advantage receiving a 11.2% premium above the NHS Equivalent Cost. However, the ISTCs needed to not only cover their operational costs with this payment, but also their capital costs (capex). The ISTCs did not receive an additional budget allocation for capex like the NHS TCs. The general industry benchmark for the capex component is 10%-15% of the total annual costs of an ISTC, which matches closely with the ISTC premium payment.

There are a number of other items which could be argued as to why the ISTCs should receive a premium payment. The contracts are only five years with no commitment to renewal at the end of the contract period, unlike the NHS, where these contracts are open ended. This ignores other issues such risk transfer of capital costs which the NHS TCs did not have to consider. And there are certainly tax issues, which the NHS does not have to consider. Because of the confidential nature of these contracts we cannot construe whether the premium payment matches with the actual capex commitments (which vary dependent on the contract and the type of procedures to be provided) and other risk factors. But considering the above mentioned risk factors, it is likely that this premium is not excessive.

NHS Trusts under Foundation Trust status have a portion of their payment based on the HRG system. However, of the NHS TCs case studies, none were under Foundation Trust status. The number of NHS TCs under Foundation Trust status could not be determined, as the specific providers were blinded. However, we can fairly assume that the number is inconsequential, as the Foundation Trust process is a

[2] The NHS Equivalent Cost is a calculation of the amount of money that would be paid to an NHS provider for delivering a certain activity with the same care pathway (Health Committee, 2006).

fairly recent phenomenon. Furthermore, even if a Trust was under Foundation Trust status, the respective treatment centre would still be receiving a budget payment from the Trust due to the organisational integration of the facility (Organisational integration as a separate item will be more fully discussed in Section 6.3.4.). As a result, neither varying payers, nor the payment mechanism can be alternative explanations for differences found in the evidence.

6.3.3 Case Mix Selection

An alternative explanation for the differences in performance could be that the independent sector may actively select (e.g. age, severity, etc.) patients with lower risk than the NHS TCs. The business model of both kinds of Treatment Centre involves selecting patients that are appropriate for outpatient, day case or short-stay surgery. However, in practice the actual case mix of the patients between ISTC and NHS TC providers may differ.

In Chapter 5, the researcher reviewed the admissions policy and then the actual practices of the ISTCs and NHS TCs. Certain exclusion criterion (e.g. Body Mass Index or BMI) were used to decide whether to admit. Though the exclusion criteria varied slightly from facility to facility, generally speaking, the specific criteria were relatively similar, with the emphasis on ensuring that the patient was appropriate for the treatment centre. Upon review, there was very little difference in the patient selection and admission documentation forms in the ISTCs and NHS TCs.

The quantitative as well as the qualitative evidence suggests that elective care patients appropriate for the NHS TCs (e.g. cataracts, hips, knees and hernias) are no different in case mix complexity than within the ISTCs. Therefore, it cannot be argued that ISTCs are actively selecting patients with a lower case mix complexity. However, at the same time, it was also apparent that NHS TCs mixed non-appropriate patients with appropriate ones and used the same staff from the Trust Hospital. The NHS TC staff then proceeded to practise in the same manner as in the general hospital, undermining the treatment centres' goals of differentiating themselves from NHS Trust hospitals. Time and time again it was found that the NHS TCs were admitting non-appropriate, non-elective, patients to the treatment centre. The ISTCs neither accepted non-elective surgical patients, nor did they accept medical patients (which we found in one NHS TC).

It should be added that a number of the ISTCs were in fact beginning to admit more complex patients (ASA 3's, even ASA 3 unstable patients), even though their original patient selection criteria and contract with the NHS did not include this. Early in the Treatment Centre Programme, many of the ISTCs were not getting the referrals needed to operate at 100% of the negotiated contract. Although the ISTCs were paid whether they undertook these volumes or not, a number of the ISTCs chose to begin admitting these more complex patients in order to get closer to operating at their contractual volumes.

The qualitative data shows that there is very little, or no difference, in case mix of appropriate patients for the facility (e.g. cataracts, hips and knees). As a result, the evidence suggests that there is no proof that ISTCs are actively selecting patients with a lower case mix than NHS TCs. However, clearly, the NHS TCs, due to pressures from the NHS Trust Hospital and scheduling of the consultants, allowed for non-appropriate patients to enter the facility.

However, the fact that non-appropriate patients were admitted to NHS TCs cannot explain the differences in performance identified in the earlier chapters. In theory, the older the patient, the higher the co-morbidities are to be expected. Therefore, if there is a difference in the case mix of patients, we would expect patient age to be lower in treatment centres than in General Hospitals. Of the elective HRG admissions policies from the qualitative analysis and discharge records from the quantitative analysis, the patient cases are very similar with little significant differences in age and deprivation (IMD) scores.

6.3.4 Organisational Integration

From the evidence in Chapter 5, it is clear that there are differences in organisational and management practices between the ISTCs and NHS TCs. Some of these arise from organisational integration factors. As a result, these organisational integration factors could provide an alternative explanation for the differences in performance.

The entire business model of a treatment centre revolves around selecting patients that are appropriate for outpatient, day case or short-stay surgery and maximising throughput of the facility. The entire facility needs to be operating in an integrated manner. It is important for the facility to be a self-contained unit so as to minimise disruptions in the operational flow and therefore maximise throughput. From the site

visits a key differentiating factor was the technological and organisational integration of the diagnostics unit within the treatment centre; or lack thereof. All six (6) of the ISTCs had integrated diagnostics units, whereas six (6) of nine (9) of the NHS TCs shared diagnostic services with the NHS Trust Hospitals.

During the patient's visit at ISTC A, the patient would be seen by the consultant surgeon, diagnostics would be undertaken, the surgeon would make the final decision based upon the diagnostics, and then the patient would be preassessed. This could take up to four hours, still short enough to be completed in a half-day, and the patient would only have to come in one time prior to surgery. All of the ISTCs visited had this capability and were operating in this manner. In contrast, at the NHS TCs visited, even if the facility had this capability, more often than not they were unable to operate in this manner.

Most of the NHS TCs had their diagnostic facilities located in and shared with the NHS Trust Hospital. As a result, patients would need to be transferred outside of the treatment centre and into the hospital. This created the potential for delay. Of the NHS TCs visited, only one had a self-contained radiology unit and thus was not dependent on the nearby Trust Hospital.

There were other potential issues when diagnostics were provided by the NHS Trust Hospital and were not physically located in the treatment centre. For example, there were significant wait lists on MRI scans, which impacted elective patients referred from the treatment centre. Operational flow is essential for a treatment centre.

One of the most compelling cases in differentiating diagnostic wait time was the case of an NHS TC and ISTC situated adjacent to each other. Both outsourced this function, though the NHS TC also used the MRI unit of a neighbouring hospital. The NHS TC's wait list period for a scan was six to eight weeks, whereas the ISTC had a scan wait-list period of one to three weeks while using an MRI unit from the same NHS Trust.

The overriding conclusion is that the diagnostics within the NHS TCs were not thought of as an important component of the treatment centre and their impact on the facility's operational flow was not properly considered. Systemic delays within the entire NHS Trust Hospital trickled down to delays within the treatment centre. Overall the lack of a self-contained diagnostic imaging unit affected the elective surgery wait lists and how quickly these patients could gain access to surgery. If the treatment centre had to compete with the other demands of the Trust then this flow

was broken and the inherent efficiencies of a treatment centre could not be fully utilised. This last point raises the question of whether the evidence found was a result of simply integration or ownership. The following section will seek to further answer this question.

Beyond the diagnostics unit, evidence showed there is a close physical and organisational integration of the NHS TCs with the respective NHS Trust Hospital in operations and staffing. All of the ISTCs visited were stand alone centres that were entirely self-contained operationally. Of the nine NHS TCs assessed, only three were physically self-contained. Of these three, one is now closed and the other two had some cross staffing. The other six NHS TC facilities were never stand alone and thus fully integrated into the NHS Trust Hospital. Clearly, the close, or even physical, integration of NHS TCs with Trust Hospital facilities may impact on the operations of the treatment centre.

The first ramification of integration with Trust Hospitals is that most NHS TCs are not being used as intended, that is, as treatment centres. The evidence suggests that the ISTCs are not actively selecting patients with a lower case mix than the NHS TCs. However, the evidence does indicate that NHS TCs mix appropriate patients with non-appropriate ones, and mix dedicated treatment centre staff with staff from the Trust hospital (the latter tend to operate in the same manner as they would in the general hospital). The evidence also suggests that NHS TCs that are physically linked to NHS Trust Hospitals have more difficulty operating in the way intended and thus have poorer performance levels.

The ISTCs are predominantly stand alone entities with dedicated staffing and patients. These ISTCs do not accept non-elective surgical patients, nor do they accept medical patients, which we found in one NHS TC. Particular emphasis was given to comparing ISTCs and NHS Treatment Centres, as both types of facilities attempt to select the same type of patient.

The case studies provide significant supporting evidence for this. NHS TC EE's nurse manager's comment sums up quite well the issue with the NHS TCs

> *we have 5 operating theatres in the treatment centre and 15 in total. In reality the 5 operating theatres act as an extension of the hospital and have never operated in the way they were intended to operate – as a treatment centre. They mix and match main operating theatre patients with treatment centre patients.*

NHS GG seemed to be uniquely insulated from the Trust Hospital, but this is almost certainly because of the adjacent ISTC. The nurse manager commented that the facility

> *is becoming a true treatment centre because of pressure from the ISTC and that contract...This positive influence has made us become a true treatment centre, more independent from the NHS.*

The nurse manager went on to say that *"the NHS still wants to put non-appropriate patients within the facility,"* but the physical distance from the Trust and the fact that *"we are becoming more business oriented due to the contract with the ISTC has made us become more focused."*

Another important reason for this unique physical relationship with the ISTC has been the recognition that a business manager is needed at the site. The nurse manager commented that

> *an important point is that we have spent a lot of time needing a person to manage the contract with ISTC. We do not have that capacity here to manage the contract, but the ISTC is pushing us become more contractually focused, which is good. This creates tension but the results have been positive.*

Many clinicians, economists and policy-makers have commented that fragmenting the health care delivery system will reduce efficiency, increase costs and decrease quality. However, evidence here suggests the close physical integration with the Trust Hospital facility may have some negative impact upon the operations of the treatment centre.

The ISTCs were found to be technologically integrated, whereas the NHS TCs were not. The researcher found that there were not great differences in the use of technologies between the independent sector and NHS. The main reason for the NHS TCs not being technologically integrated was in fact because of the organisational integration with the NHS Trust Hospital. This organisational integration, allowed for various NHS Trust problems and pressures emanate from the Hospital to the treatment centre, creating problems in being able to integrate fully technologically.

The ISTCs were found to be better operationally integrated to function as a treatment centre than the NHS TCs. An important ramification of the operational integration with Trust Hospitals is that most NHS TCs are not being used as intended, that is, as treatment centres. As a result, the evidence suggests that the NHS TCs have

more difficulty operating in the way intended and thus have poorer performance levels.

These organisational integration factors could provide an alternative explanation for the differences in performance. However, though this may explain some differences in performance, it cannot explain all of them. From the research, stand alone NHS TC facilities were still similar to the NHS TC facilities that were integrated to the NHS Trust Hospitals in their organisational structure, skill mix, staffing ratios and management practices. As a result, one cannot argue that if the NHS TCs were all stand alone facilities, we would see an equalisation of performance. Therefore, we cannot say that this by itself is an explanation for the differences in performance.

6.3.5 Ownership

There are three important factors that differentiate private ownership from public ownership: the degree of autonomy, residual claimant status and accountability. By virtue of their different ownership, ISTCs have more autonomy, more internal accountability of employees to management and can claim residuals. These all create a difference in culture of the organisation, which also comes out in a number of difference cases. These three important factors will be discussed in more detail in the following paragraphs. It is also useful to provide additional information on the individual owners of the ISTC case studies and some indication as to how the various owners themselves might have shared management decision-making and working patterns observed. Detail and motivations of these various owners are described in more detail in this section.

Though there are varying types of public and private ownership (Busse, Van der Grinten et al. 2002; Harding and Preker 2003; Deber, Topp et al. 2004), and it is important to recognise these when assessing the evidence, for the purposes of this research we merely differentiate between two types of ownership: public and private. Public ownership is a set of arrangements where the government or state owns the asset. In this case the National Health Services and the employees within a publicly owned entity are public sector employees and are bound by public sector employment regulations.

This sub-section will use the Preker and Harding framework (2002) and assess how, within the framework, the impact of changes in the market environment is

determined by the combined influence of a number of critical determinants of the hospital's incentives. These critical determinants include the allocation of decision rights; distribution of residual claims; and structure of accountability mechanisms.

Decision or Management Rights (Autonomy)

It has been argued that independence or autonomy of management rights is an important factor in determining performance (Preker and Harding 2002; Deber, Topp et al. 2004). Many attempts to address problems in publicly run health care delivery systems have been made through management reforms. Managerial behaviour can be influenced by expanding manager autonomy or rights to make decisions. Thus, each reform can be characterised by the magnitude of control shifted from the hierarchy, or supervising agency, to the hospital. Some indeed have argued that autonomy, rather than ownership, is the overriding determinant of performance (Chubb and Moe 1990). Therefore it is possible that autonomy, rather than ownership itself, is the primary explanation for differences between the NHS TCs and the ISTCs.

There was some evidence that the relative autonomy of the NHS TCs was leading to changes in management practices. One NHS TC has had its staff trained by the local Marriott on customer service. This same NHS TC was hiring a number of individuals from outside of the industry. Recently, a logistics person was hired that had experience in the manufacturing industry and was active in using the NHS Gateway program which provides financial support to hiring highly experienced people outside of NHS (NHS Gateway Programme 2008). Two of the NHS TCs (NHS TC BB and DD) were in the process of purchasing a patient booking system; the same system that airlines use. The use of the patient booking system will deemphasise the need for nurse schedulers finding available staff to fill in gaps at the last minute. Another NHS TC recently hired a new individual responsible for materials with the result of inventory being reduced by 50% over the course of the past year. Further, the same treatment centre succeeded in getting much of the inventory from one product company, and thus attain better pricing, further reducing costs.

However, those examples aside, the research evidence showed that, if we compare ISTCs to NHS TCs, broadly we see that within the NHS TCs, there has been merely a transfer of the same NHS practices to a different facility. Further, we found that a critical barrier to applying 'best practice' principles from the private sector was the

broad lack of control that NHS managers have over factors of production, especially labour, or in this case NHS consultants. Thus, although methods for reinvigorating NHS organisations were sometimes successfully transferred to NHS TCs, more often than not, the common constraints generated by public sector control structures have frustrated these attempts.

In summary, autonomy could explain some aspects of performance, as none of the case study Treatment Centres were under Foundation Trust status. However if the associated NHS Trust Hospital was under Foundation Trust status, it is far from certain the autonomy would necessarily trickle down to the Treatment Centre level. Just because a hospital comes under FT status, would we find a manager running the treatment centre? Would we find that the managers have control over the inputs, labour, scope of activities, and clinical management? Though the evidence suggests this is not the case, we cannot answer this question without completing the picture, which we intend to do in the following sections.

Residual Claimant Status

Ownership is important because having private residual claimant status on revenues gives managers the ability to use additional incentive mechanisms. It is clear that the public sector and independent sector use different methods of financial remuneration vis-à-vis performance. In the ISTCs consultants are paid on a salary basis, but there are strict controls to ensure throughput levels necessary to achieve the contract's objectives are reached. The consultants are paid for overtime as well. This resulted in better scheduling, lower did not attend (DNA) rates and lower cancellation rates. It was apparent that consultants were being utilised in the theatre at a higher rate than the NHS.

When a hospital has 'residual claims,' it is allowed to keep resources that it has not used to meet its objectives, rather than return them to the treasury or local government. These residual claims can then possibly be distributed as financial remuneration to the employees. However, just because hospitals and managers are given additional autonomy, it does not necessarily follow that they will use their added discretion productively. To achieve this, managers must be provided with the tools to incentivise employees and maximise productivity, along with their greater autonomy. The linking of these incentive factors is an important component of property rights theory (as discussed in Chapter 2), which emphasises the importance

of aligning revenue flows and decision rights appropriately to bring about the right decisions. Residual rights and returns not being aligned can cause serious problems. The literature review showed that the method of financial remuneration creates certain incentive mechanisms. The evidence shows how this theory is realised in practice.

The ISTCs must report 26 key performance indicators (KPIs) to the Commercial Directorate on a monthly basis. ISTC A stated that they were not happy with the performance of their consultants, with respect to achieving these minimum quality outcome thresholds. Up until the interview, consultants had been paid their salary whether the KPI thresholds had been reached or not. The new planned scheme was intended to incentivise the consultants so that their salary was more closely aligned with achieving KPI thresholds.

ISTC C was unique in the fact that it focused on three clinical specialty areas, each of which had a different financial remuneration structure. For ophthalmology, the operator used rotating consultants, who were paid on a per case basis, incentivising the administrator to fill the operating list as much as possible. The general manager pointed out that the consultants were complaining that they were unable to fully book their list, since the facility was not operating at full capacity. The gynaecology services were paid on a list basis. In this case, the administrator was incentivised to fully book the list, as the consultants were paid the same regardless of the number of patients on the four hour list.

General surgery consultants and the anaesthetist within ISTC C were full-time employees. There was no variable incentive component in place. However, due to the fact that the operating capacity of the facility was so low, management felt that financial incentives for the consultants would be of limited value.

ISTC H had a two component incentive system. First, if the surgeon was self-employed, the individual was paid a session rate plus a fee for going over and above the expected number of procedures during a session. Second, there was in place a company incentive scheme. The incentive scheme was based upon KPI quality indicators reached.

NHS TC incentive schemes were the same as for the NHS as a whole. An outlier case was NHS TC BB in implementing 'flex' (e.g. flexible) scheduling for all staff, not just consultants. The employees were paid for hours worked, regardless of time during the work week. The flex scheduling was likely due to the immense pressure put upon the NHS Trust Hospital to achieve waiting list targets. To achieve these

targets, the hospital and treatment centre added evening and weekend lists. At the same time, budgets had been cut. The facility had implemented these new methods of scheduling and incentivising their employees in response to the competing pressures to decrease wait lists and control costs.

The flex scheduling was also likely the result of a number of clinical cancellations. The NHS TCs that only scheduled procedures the day before were more likely to see a higher per centage of clinical cancellations than NHS TCs (e.g. NHS TC BB) and ISTCs that planned surgeries weeks in advance.

At the same time, there are few, if any, incentive mechanisms in place for NHS consultants to bring down Did Not Attend (DNA) and cancellation rates. The NHS consultant is paid for a certain number of hours worked per week and assessed by operating theatre utilisation, not performance. However, operating room utilisation fails to reflect genuine service efficiency or quantitative aspects of theatre output (Faiz 2007).

NHS TC BB found that they could incentivise the theatre staff through a shared bonus scheme. One per cent of cost savings from procurement and productivity would be shared by the theatre staff. It was stated that £5m were saved in the previous year and they expected improved savings in this fiscal year.

NHS TC BB and EE incentivised staff by scheduling operating theatre time for private patients. One of the treatment centres, and the respective Trust Hospital, did not have wait lists, whereas the other one did. This indicates there are likely some longer-term policy issues, such as cream skimming and the use of public assets for private patients, which need to be addressed.

NHS TC EE was not yet under Foundation Trust status and thus was limited in its ability to give pay raises. Therefore, the Trust Hospital and treatment centre emphasised a staff retention scheme. Under the scheme, a £50 additional payment would be paid to staff who had worked for the Trust for a certain period of time. Further, for other staff, a 0% interest loan towards the purchase of a property or financial support for rental accommodation was available.

Within all the facilities it was clear that there was some tension between the administrators and consultants. The administrators were attempting to create the appropriate incentives for maximising consultant utilisation. The consultants, on the other hand, would continuously push back, to maintain their independence. In the NHS, however, this tension was much more apparent. NHS TC consultants cited any

number of reasons for not being able to perform (e.g. notes) and repeatedly stated that using various incentives for maximising consultant utilisation within NHS was not the NHS they knew.

Broadly, it is clear that there are differing methods of financial remuneration between the independent sector and the NHS vis-à-vis performance. The remuneration within the ISTCs is more closely linked to performance. While within the NHS TCs, there are numerous benchmarks that the organisation attempts to achieve as a whole, these benchmarks are not closely aligned with the financial remuneration of the employees.

With respect to the residual claims of the treatment centre, there is a difference. ISTCs are given a material interest in maximising productivity. Residual claims are distributed to their shareholders and as stated in the previous paragraph, residual claims can be, and are, distributed within the ISTCs as financial remuneration to the employees. Though typically the variable component is not more than 10% of the total financial remuneration, the evidence suggests that this is sufficient to motivate the staff. Broadly, the NHS TCs are merely a budgetary unit of an NHS Trust Hospital. As a result, with the NHS TC, excess resources, if any, are rolled up into the NHS Trust.

Accountability Arrangements

Reform attempts in countries are also characterised by the degree of accountability for achieving objectives. As these reforms delegate some decision rights to the hospitals, the government's ability to assert direct accountability (through the hierarchy) diminishes. Thus reform plans included a range of accountability mechanisms that would work in the new environment. Most reforms relied at least partially on market pressures to create accountability, as markets were perceived to provide an evaluation of performance that was neither political nor arbitrary. In some cases, where the capacity of government funding authorities was higher, efforts were made to move toward purchasing with these funds. These countries intended to rely on this purchasing (and the contracting and monitoring process) to generate accountability. In England, two examples are Payment by Results and the KPIs used for the ISTCs.

The clearest example within this dissertation focused on England's experience is transparent management accountability within the organisation. The management

structure of the facility, consultant reporting, perception of management control over the consultant, the ability of administrators to incentivate the consultants and the role of anaesthetists within a facility, were all reviewed in the previous chapter. There was a clear difference between ISTCs and NHS TCs.

To further quantify, in all seven (7) ISTCs, these was a fairly flat organisational structure. In all of the ISTCs there was a clear cut delineation of management responsibilities. There was a general manager in each and every facility. Further, in eight of nine of the facilities the consultants reported to the Medical Director of the respective facility. The lone exception was due to the unique structure of a shared facility with the NHS. In this case, there was only the operating theatre staff and three support staff. As a result, the consultants reported to the Medical Director of the organisation.

The NHS TCs provide an entirely different picture. In only two (2) of the nine (9) NHS TCs was there a dedicated facility manager. Within the nine (9) NHS TCs, consultant reporting was unclear in three (3) of the facilities and in a further four the reporting was to the department head of the Trust Hospital.

These findings are consistent with the perception of management control. The perception of management control within the ISTCs was clearly higher. It is interesting to note though that within the NHS the perception of management control was 'good.' The interviewer had to tease out additional information based on the positive response on management control. Clearly, management control of good meant the same as within the NHS Trust Hospital or no less. As a result, what 'good' means to the NHS is different than 'good' to the ISTC, implying that there were different standards, or level of expectations, between the NHS and ISTCs. Though this cannot be quantified, time and time again, this information was teased out from the qualitative research.

Ownership and Motivation of the ISTCs

Within the private sector, individual owners face differing motivations and employ differing methods. Beyond private versus public ownership, these unique characteristics within the private sector can drive management decision-making and working patterns, and this may impact the evidence observed. Some background information on the different owners of the ISTCs is presented here. The different owners include Care UK (originally Partnership Health Group), UKSH, Mercury

Health, which was run by Ascent Health under management contract, Interhealth Canada, Netcare and Capio.

Partnership Health Group was a joint venture between UK-based Care UK and Life Health Care (formerly Afrox) from South Africa set up to bid on the ISTC Programme. Care UK, a local UK operator of over 90 nursing and residential homes for older people, partnered with Life Health Care, an experienced hospital provider which was seeking access to the UK market. In August 2008, Care UK acquired the remaining 50% share of Partnership Health Group (PGH) from Life Health Care of South Africa. Currently, Care UK is the largest ISTC operator in the UK, operating 10 facilities within every SHA in the country. Care UK also operates GP practices, NHS Walk-in Centres and GP out-of-hours services, as well as highly innovative Clinical Assessment and Treatment Services (CATS). The strategy for the joint venture partners was that both wanted access to the UK market. Care UK desired a presence in the clinical side, in addition to its existing expertise in nursing homes, whereas Life Health Care wanted to grow outside of the Africa market. Life Health Care, sought access to the UK market specifically due to linguistic and cultural similarities with the South African market, and also because of the lower cost of labour, a similar strategy as the one Netcare adopted (see below).

UK Specialist Hospitals (UKSH) was set up by OR International (ORI), a US-based developer of specialty hospitals, and New York Presbyterian Healthcare System, a comprehensive university hospital affiliated to both Columbia University and Cornell University. Prospect Investment Management, a venture capital investment company is also a shareholder in the partnership. UKSH currently operates the Shepton Mallet ISTC in Somerset, which opened in July 2005.

Mercury Health was set up by UK-owned Tribal Group to bid on the ISTC Programme. Tribal, a listed company on the London Stock Exchange, is a public-sector consulting and outsourcing group. Tribal works with a wide range of organisations across the public sector, including schools, colleges and universities; the NHS and primary care trusts; local authorities and housing associations; central government departments and government agencies; and third sector organisations.

Mercury Health contracted with Ascent Health, a US investor and operator of treatment centres. Ascent Health was interested in expanding internationally and using its experience in the US as a basis for international expansion, in line with the the global trend of shifting patients away from inpatient hospital care. The private

management contract was seen as a low risk strategy to attain local market expertise and gain a foothold for expansion in the UK.

In April 2007, Tribal sold Mercury Health at a profit of £77 million. The strategy from the sale was to reduce debt and allow the company to focus on its core education and public-sector consultancy business. The ISTC business was seen as a highly capital intensive and Mercury needed additional capital for investment to build more clinics. As a result of Tribal's strategy of paring down debt, Mercury's ISTCs were sold to Care UK.

Interhealth Canada is a Canadian-based operator that initially won two contracts to treat patients in the Midlands and Merseyside. Interhealth is purely an international operator that seeks to leverage Canada's expertise in health to provide similar healthcare experiences in the international environment. Interhealth currently operates in various countries in the Gulf, and recently won a contact to manage the entire health system of the Turks and Caicos Islands. Interhealth Canada was originally set up by the Canadian government, as part of its export promotion strategy. Currently, it is still partly owned by the Canadian government with the remaining shares owned by individual private investors. It is important to recognise that Interhealth Canada's ownership has an impact on its motivations and time frames for a return on investment, which may differ from the others such as the private equity firms.

Netcare UK, a subsidiary of Network Healthcare, South Africa's biggest health care provider, runs mobile cataract surgery units as well as the Greater Manchester Surgical Centre, which performs surgical procedures in a variety of clinical areas[3]. Netcare's key motivation for entering the UK was the limited market expansion opportunity in South Africa, as well as the African market in general, and the recognition of a competitive advantage it would have from being able to use consultants and nurses from South Africa in England. This is because, while there are many similarities between the UK and South Africa in terms of language and medical practices (South Africa is a former British colony and its health system is set up along similar lines to the UK's) labour costs of South Africa's consultants and nurses are much lower. As a result, the UK was seen as the key country for market expansion out of Africa.

[3] This dissertation focuses on England in the Treatment Centre Programme. However, it is noteworthy to mention that Netcare also operates an ISTC in Scotland.

Capio is a Swedish provider of healthcare services for both public and private customers via its acute general hospitals, diagnostic centres and private psychiatric hospitals. It is active in Sweden, Norway, Finland, Denmark, France, Spain, Germany and the UK. Capio UK has nine treatment centres throughout England, in addition to its chain of over 20 private hospitals. In May 2004 it was awarded a £25m short term contract to treat 9,000 NHS patients over the following year. The contract covered mainly orthopaedic surgery as well as a mix of other specialties including ENT, general surgery, urology, and plastic surgery. These NHS operations were conducted in 15 existing Capio hospitals in the following eight NHS Strategic Health Authority regions: Bedfordshire and Hertfordshire, Cheshire & Merseyside, Greater Manchester, London North East, London North West, London South East, London South West and South Yorkshire. Capio also won contracts to build and operate a number of treatment centres.

Following the private equity buying spree, Capio was acquired by Apax. At the same time, Apax teamed up with Netcare to buy General Healthcare Group, the UK's largest private healthcare provider, Apax was forced to sell Capio UK as a result of that deal to appease antitrust regulators. In 2007, Capio UK was sold to Ramsay Healthcare, Australia's largest health care provider.

The US and Canadian operators (Ascent Health, OR International) saw in the ISTC programme the opportunity to leverage their experience in the UK. The South African providers (Life Health Care and Netcare) were primarily hospital operators but saw the opportunity to expand out of the Africa market, as well as leverage the lower cost of labour which was in relatively abundant supply as compared to the UK. Care UK, a local UK provider as well as Mercury did not have experience nor expertise in the treatment centre market and as a result partnered with those operators that did have this business expertise.

While it is important to recognise the diversity of private owners, it is perhaps more notable that the providers are more similar than different in their organisational and operational approaches. The owners originate from a wide range of countries – the United Kingdom, the USA, Canada, Sweden and South Africa – and a correspondingly wide range of health care systems. They are also comprised of a different sizes and experience levels, and distinct ownership structures, ranging from private equity firms to partial government ownership. These differences could be

expected to contribute to a much larger diversity of operational approaches than those that were observed.

This is not to say there are not differences among the operations of the private companies. The types of scheduling employed differed, some ISTCs outsourced their diagnostics, while others had self-contained units, and some ISTCs employed physician incentive structures, and others did not, for example. Still, on the whole, the differences were less prevalent than the similarities, especially given the different backgrounds of the ISTCs.

This similarity is an important point. When comparing the different providers from various countries and regions, it is notable that they are more similar than different in their organisational and operational approach. All of these providers have their own way of operating, are characterised by distinct educational and training background for the clinicians, and are regulated by different sets of rules in their originating countries and this may may drive differences in their approaches, beyond the public versus private ownership divide. However, a very important finding is that these operators were more similar in their approach than different. This reinforces the argument that it is ownership that is a key determinant of operational success, since such a heterogeneous group of ISTCs arguably exhibit more similarities as a group, than the NHS TCs, which are all operated by the same institution, the NHS.

A summary of the benefits brought by the new market entrants and various private operators is taken up and expanded in the final chapter, with particular reference to the ISTCs' ability to recruit new clinical staff, set clear management expectations and care processes, among others.

6.4 Discussion

There are a number of overall conclusions that can be drawn from the analysis. However, due to the nature of the recent introduction of the ISTCs and the method in which the NHS tendered for the treatment centres there may be significant limitations to the findings. The findings and limitations will be discussed in this section. This section will conclude with suggestions for further research in this area.

6.4.1 Overall Findings

There is no doubt that competition, the method of reimbursement and the level of integration exert a powerful influence on the behaviour of hospitals as well as the management and staff within them. However, because of their complexity and

interconnectedness, it is often hard to tease apart the different sources of influence. The researcher theorises that there are five potential rationales for these differences.

Rationale 1: Competition May Explain the Difference in Performance

From the quantitative and qualitative analysis there is very little, or no, direct competition between the ISTCs and NHS TCs in England. There could be indirect competition, or peer effects, which can be an important determinant of a facility's efficiency. However, again, the ISTCs are not in competition with the NHS TCs. The NHS TCs may in fact feel more competitive pressure, because ISTCs have better performance than NHS TCs. This would more likely to lead to an equalisation of performance between them rather than creating differences in performance. Further, there is no evidence that ISTCs are under greater competitive pressure than NHS TCs. For the most part, ISTCs have been situated in areas outside of major cities, whereas the NHS TCs are situated in and around major cities, suggesting that ISTCs should face less competition than the NHS TCs. Therefore competition does not explain the differences in performance between the ISTCs and NHS TCs.

Rationale 2: Payment Methodology May Explain the Differences in Performance

We cannot say that differences in payment methodologies account for differences in performance. ISTCs and NHS TC providers both treat NHS patients and as a result, the payer (NHS) is the same. Further, both IS and for the most part NHS facilities are paid via a budgetary payment. None of the NHS TC case studies from the qualitative analysis were under Foundation Status. However, there may be some cases of NHS Trust Hospitals under Foundation Status. If so, we would expect to see higher performance at the associated NHS TCs, as these would presumably be paid based on the HRG, or prospective payment methodology. This is not the case.

The ISTCs are receiving a 11.2% premium above the NHS Equivalent Cost. Some could argue that the ISTCs have an unfair advantage from this extra payment. However, unlike the NHS TCs, ISTCs need to not only cover their operational costs with this payment, but also their capital costs (capex). Further, this extra payment ignores other issues such risk transfer of capital costs which the NHS TCs did not have to consider and tax issues.

Rationale 3: ISTCs Lower Case Mix Selection May Explain the Difference in Performance

Another explanation for the differences in performance is that the independent sector actively selects patients with lower risks than the NHS TCs. The researcher concludes that this explanation cannot be correct. The entire business model of the treatment centre, IS and NHS, revolves around selecting patients that are appropriate for outpatient, day case or short-stay surgery. The researcher reviewed the admissions policy and then the actual practises of the ISTCs and NHS TCs. The admissions policies were more or less the same between the ISTCs and NHS TCs. The evidence suggests that elective care patients appropriate for the NHS TCs (e.g. cataracts, hips, knees and hernias) are no different in case mix complexity than within the ISTCs. Therefore, it cannot be argued that ISTCs are actively selecting patients with a lower case mix complexity. However, the NHS TCs, due to pressures from the NHS Trust Hospital and scheduling of the consultants, allowed for non-appropriate patients to enter the facility. Time and time again it was found that NHS TCs were admitting non-appropriate patients to the treatment centre. The ISTCs did not accept non-elective surgical patients, nor did they accept medical patients, which were found in one NHS TC.

However, the qualitative evidence supports the findings from the quantitative analysis in Chapter 4. Of the elective HRG admissions policies from the qualitative analysis, and the discharge records from the quantitative analysis, the patient case mix is similar. As a result of this evidence, the researcher concludes that the allegation that ISTCs perform better by actively selecting lower case mixes within the specified HRGs cannot be true, nor did they actually treat less complex cases. The interview results do show that NHS TCs were admitting non appropriate patients; however, these are patients not within the specified HRGs (e.g. medical patients and not elective patients within the specified HRGs) for which the research was focused.

Rationale 4: Integration May Explain the Differences in Performance

The importance of integration was made clear during the site visits. Technology and the role it plays in the organisation's integration were discussed in Chapter 5, as well as how important integration is in determining facility performance. From the site visits, the researcher found that there were not great differences in the use of technologies between the independent sector and NHS. However, there are clear differences between the ISTCs and NHS TCs in how technology is organised in daily

operations. These differences include the location of the technology and how it was integrated into the operations of the facility. Specific examples are provided with the PACS, consultant notes and the diagnostic imaging facilities. Electronic record keeping, via the use of the PACS, was better positioned and utilised in ISTCs than in NHS TCs. In the ISTCs these were typically located within the facility, whereas within the NHS TCs these were often located inside the NHS Trust Hospital.

Diagnostics in NHS TCs were not thought of as an important component of the treatment centre and their impact on the facility's operational flow was not properly considered. Six (6) of the nine (9) NHS TCs shared diagnostic services with the NHS Trust Hospitals, whereas all of the ISTCs had their own self-contained unit. Systemic delays within the entire NHS Trust Hospital trickled down to delays within the treatment centre. Overall the lack of a self-contained diagnostic imaging unit affected the elective surgery wait lists and how quickly these patients gained access to surgery. Operational integration is essential for maximising operational flow.

There are clear differences in the issue of consultant notes. In the ISTCs, patient notes were typically in electronic format so that if physicians needed to refer to them, they were readily accessible. Furthermore, what the patient notes contain and what the consultants feel they need for information was also different. Within the ISTCs, patient notes were systematic records of a patient's diagnosis and procedure. Within the NHS, patient notes contained entire patient records and often solely in hard-copy. This, as well the perception that an entire patient's history was required prior to a procedure, created coordination problems and could lead to delays and cancellations.

Further, the ISTCs were set up to function as operationally stand alone facilities. Six of the nine NHS TCs facilities were physically integrated with the NHS Trust Hospital and in all but one of the NHS TCs, the organisation was beset by cross-staffing and shared resources with the Trust Hospital. As a result, the close, or even physical integration with the Trust Hospital facility may impact the operations of the treatment centre.

However, though this may explain some differences in performance, it cannot explain all of them. Stand alone NHS TC facilities were still similar to the integrated NHS TC facilities in their organisational structure, skill mix, staffing ratios and management practices. The interview results suggest that consultants are using the treatment centre operating theatres in the same manner and for the same types of patients as the main hospital operating theatre. Anaesthetists are using the same

anaesthesiology, irrespective of whether the surgery could be done on a day case or inpatient basis. A CEO of one of the ISTC operators stated that additionality was actually a good thing for the ISTCs and NHS. He likened the experience to the expansion of BMW and Mercedes into the US. The German car manufacturers did not set up their automobile plants in Detroit, but rather they went to Alabama and South Carolina. This allowed them to start fresh by hiring new employees not part of the existing culture. In contrast, the NHS appears to be merely transferring old habits and views to the new facilities. If this is the case, then the culture is relatively unchanged in the NHS Treatment Centres, meaning the healthcare system has actually seen very little transformation. Without a change of culture, treatment centres are little more than an extension of the existing hospital. Further evidence supporting this conclusion will be provided in the following section on ownership.

Rationale 5: Ownership May Explain the Difference in Performance

The evidence suggests that the fifth reason - differences in the organisational and operational approach between the ISTCs and NHS TCs - is the most likely reason for differences in performance. If so, then ownership is the important distinction. The evidence suggests that there are differences between the ISTCs and the NHS TCs in their use of technology, integration of the patient pathway, organisational methods such as management structure, consultant reporting, perception of management control, the skill mix in staff and staffing ratios, as well as the management practises in terms of admission to discharge.

How Ownership Matters: Autonomy, Accountability and Residual Claimant Status

ISTCs have more autonomy by way of greater flexibility on salaries, staffing make-up and ratios, less pressure from the NHS Trust Hospital operations and from the NHS Trust needing to hit targets. In general, there is less staffing in ISTCs than NHS TCs with evidence showing that ISTCs use lower staffing levels for the operating theatres. Further, the ISTCs were set out to function as operationally stand alone facilities. Six of the nine NHS TCs facilities, on the other hand, were physically and organisationally integrated into NHS Trust Hospitals, and all but one of the NHS TCs was beset by cross-staffing and shared resources. Clearly, the close, or even physical integration of NHS TCs with Trust Hospital facilities may impact the operations of the treatment centre, resulting in the fact that most NHS TCs are not

being used as intended, that is, as treatment centres. The evidence overwhelming indicates that NHS TCs mix appropriate patients with non-appropriate ones, and mix dedicated treatment centre staff with staff from the Trust hospital.

There appeared to be a significant amount of political pressure within the NHS while the research was being conducted. This pressure emanated from the mandate to hit wait list targets. A number of NHS staff stated that operations had been recently oriented as a reaction to this directive. All pro-active planning was being set aside for the time being, in order to get patients through whatever operating theatre was available on a given day.

ISTCs have more internal accountability by way of clear management structures and reporting mechanisms within the ISTC, how patients are selected and operating theatre time is scheduled. The NHS TCs provide a completely different picture in terms of who is in charge (e.g. facility manager) and consultant management. In only two (2) of the nine (9) NHS TCs was there a dedicated facility manager. Within the nine (9) NHS TCs, consultant reporting was unclear in three (3) of the facilities and a further four the reporting was to the department head of the Trust Hospital.

It is clear that there are differing methods of financial remuneration between the independent sector and the NHS vis-à-vis performance. ISTCs have greater claims over residuals and these residuals are linked with facility performance resulting in incentives are aligned with performance. In the ISTCs the consultants are paid on a salary basis with strict controls to achieve necessary throughput levels or even on a contractual basis and paid on a per procedure basis. From the evidence on volume figures, it is clear that ISTC consultants had much higher performance levels than NHS consultants. Broadly speaking, ISTCs are not paid a higher salary. However, there are certain financial incentive mechanisms in place appropriately aligned to hit performance targets. NHS consultants do not have these financial incentives to hit targets. The NHS consultants were paid on a 40-hour week based upon clinic time and operating theatre utilisation, but not performance. Clearly, utilisation is not strictly aligned with performance.

How Ownership Matters: Other Supporting Evidence

Beyond the specific evidence found in the interviews, there are a number of other findings from the research which further suggest that ownership is the most important factor for the differences found between the ISTCs and NHS TCs. These findings

involve setting patient expectations, incentive structures to lower the average length of stay, political pressure on the NHS from the stakeholders and the overall distortion in incentive structures.

It is important to set patient expectations upon their entering a facility. The ISTCs seemed to be much better in this regard; these facilities repeatedly emphasised that the most important aspect of their care was patient education and setting patient expectations. The patient would be told well in advance of admission for a procedure the intended patient care pathway and the expected date of discharge. This would also set the expectations of the family, who would need to provide the appropriate support in the home environment following discharge. In more than one NHS facility, the interviews found that patients were not able to be discharged, due to the family member responsible for home care going on holiday. This implies that either the patients and family were not properly educated and/or the NHS is perceived as a hotel.

As a result, there may be some endogeneity here, with NHS patients self-selecting a NHS facility as opposed to an ISTC. NHS patients selecting an NHS facility may, in reality, want to stay longer. A number of NHS staff stated that they were fighting a preset patient mentality, that the patients have paid into the NHS and therefore feel they deserve to stay longer.

There is an important counter argument to this. NHS patients do not directly pay into the NHS, as there are no premiums within a tax-based health financing system. It is the private paying patients who pay a premium, directly or through their employer. Moreover, private insurers are paying the private hospitals a daily rate to a specified number of days. Therefore, if this argument is true, we would expect to see private hospital patients having a much longer ALOS. However, from the evidence found in Chapter 4, it is clear that, though private hospital stays are longer than ISTCs, they are similar to the NHS TCs and much less than NHS Trust Hospitals.

The NHS has never been truly incentivised to get patients out of the hospital, as the Trust Hospitals have traditionally been paid on a hospital budget. The wait lists have been used as a policy tool to improve access to the NHS. NHS patients were supposed to be discharged more rapidly, thus lowering the ALOS and increasing capacity. However, it is not so clear that this has transpired.

Wait-lists targets and the financial incentives that drive the larger NHS Trust organisation have number of implications for how the treatment centres are managed.

The nurse manager at NHS TC EE commented, when asked how many beds the facility had,

> *I don't know because they have opened and closed so many due to budget constraints and then hitting the wait list targets.*

She went on to say,

> *it is peak and trough. In the fall [we] run short of budget so lay off staff. Then in February-March we need to achieve wait lists to hire temp staff which costs more and they do only their job because they cannot provide cross support.*

The nurse manager continued,

> *word was that the PCT said they didn't have the money this past fall for all the procedures (in deficit). Then in January, they said that they had the money (or breach would cost more) so the hospital started operating at full tilt, including Saturdays, to hit the wait list targets...Here we have the dual problem of deficit and wait list. One or the other could be manageable but both together are deadly.*

The ISTCs have differing financial incentives. In the initial period of ramping up volumes, the facilities were operating at very low capacity. Due to the structure of the ISTC contracts, these facilities would be paid whether volume targets were met or not. However, even during this period we saw lower ALOS when compared to the NHS TCs and NHS Trust Hospitals for certain procedure areas. This evidence is supported by a McKinsey analysis for the Department of Health's Commercial Directorate (McKinsey 2005).

Many of the ISTCs are now operating at very high occupancy levels. Therefore, to attain patients above the contracted volume, these facilities are incentivised to get the patients discharged as quickly as possible. A number of the ISTCs interviewed stated that they were receiving additional contracts from other NHS Trusts, with wait lists the driving force. Most of the contracts were at NHS tariff. One facility commented that they were being paid by the Trust the NHS tariff plus 10 per cent. From the Trust's perspective, this still may be less than the penalties incurred, if the wait list targets were not met.

There appears to be a significant amount of political pressure within the NHS at this moment. This pressure is felt at the facility level, with the focus on achieving wait list targets. A number of NHS staff stated that facility operations have now become reactive to achieving the waiting list targets. As a result, all pro-active planning has

been put aside for the time being, and the facilities are just trying to get patients through whatever operating theatre was available for the day.

The ISTCs were even feeling some of this sense of urgency from the NHS. One ISTC even commented that they were receiving calls on a weekly basis from the Commercial Directorate. The ISTCs visited were achieving their volume contracts and were even adding contracts and volumes. The ISTCs seemed to be somewhat insulated from politics since they are not affiliated with an inpatient hospital and since they had dedicated treatment centre staff that would remain focused on ramping up volume levels.

Another problem with public ownership is that the incentive structures in place are distorted. This may be one of the most important underlying reasons for the difference in performance. In general, the incentive structures in place within the independent sector are stream-lined, while in the NHS, the entire system is beset by cross-incentives, or even disincentives. An example is the role of the consultant who is paid for a certain number of hours worked per week instead of genuine service efficiency. An often used example is two consultants performing a four hour list. Consultant A performs one hernia during the four hour list. Consultant B performs 8 hernias during the four hour list. Both consultants are performing at 100 per cent utilisation. However, a more appropriate method of measurement would be theatre efficiency. By measuring theatre efficiency, rather than theatre utilisation, we see that Consultant B is 8 times more efficient, holding case mix equal (Dexter and Traub 2002; Dexter, Ledolter et al. 2005; McIntosh, Dexter et al. 2006).

Further, many of the NHS consultants perform surgeries in private hospitals and if the NHS consultants perform too well this may result in reducing their private patient revenues. This is because the primary reason for private insurance take-up is the long wait lists in the NHS (Mossialos and Dixon 2002), so a decline in private insurance would lead to a decline in private patient care. As a result, there is a disincentive for NHS consultants to improve their wait-list performance.

One of the most important findings from the interviews was the influence of ISTC H, which was housed within an NHS TC. This is a unique co-location with a significant amount of shared services. Initially, when the ISTC was contracted to do orthopaedic procedures, the Department of Health was bombarded with letters from the various Royal Colleges with respect to concerns about patient safety and quality of care. The ISTC's success opened the door for the adjacent NHS TC to begin doing

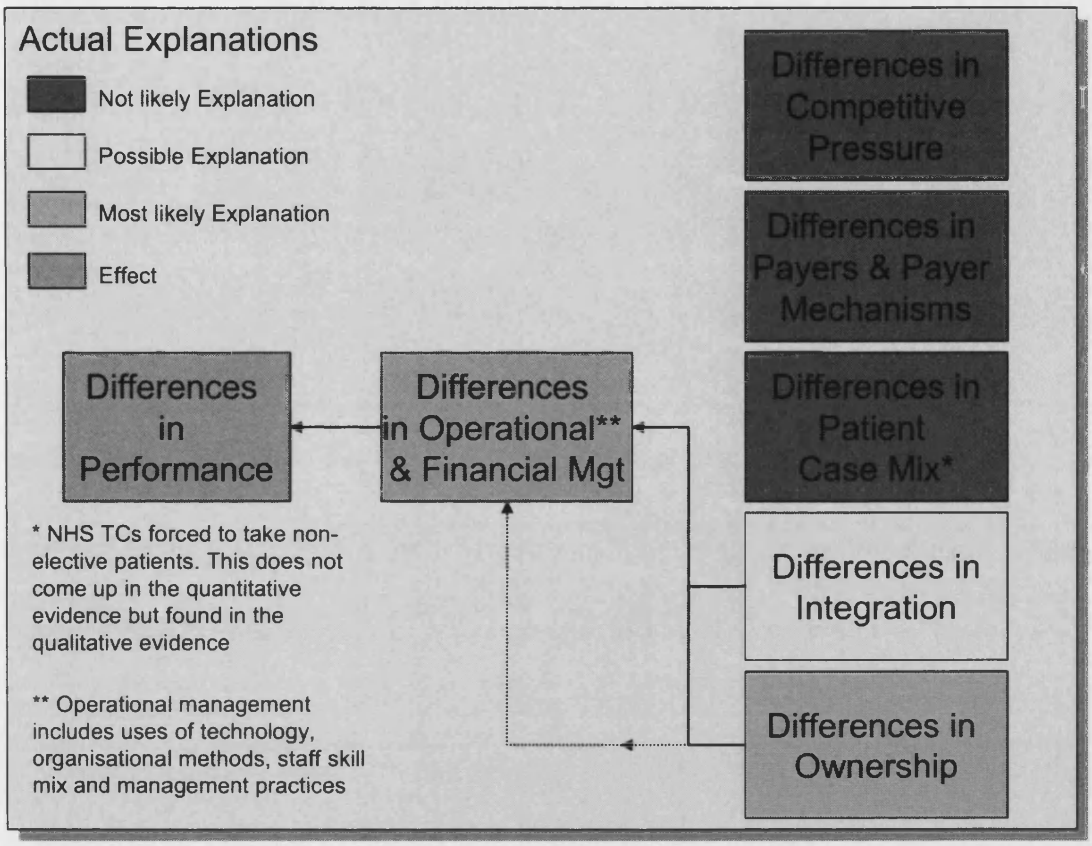
these same procedures. Also, the NHS's Royal Orthopaedic Hospital is now doing the ISTC's care management program. Further, success of the ISTC reinforced the argument for the NHS TC to operate truly as a treatment centre rather than the Trust's intention for it to serve as a day surgery centre and an extension of the trust designed to alleviate their wait list pressures.

Most importantly is the ISTC's contract with the NHS TC. The ISTC uses the NHS TC's pre-admission services, pre-assessment and post-operative care, and so the NHS true costs had to all be calculated and included in the contract. The comment was that the NHS now even knows how much it costs to send out a letter to the ISTC patient, as this all had to be calculated and included in the contract. For once the NHS knows their costs in detail. As a result, while there was a lot of front end work on the contract as well as managing of the contract during the initial period when there were delays or problems, at the same time the NHS TC and NHS Trust has been forced to become more business focused. The NHS TC is now even using the same admission and discharge criteria that were put together by the respective ISTC.

6.4.2 Discussion Summary

The graphic below provides a summary of the actual explanations that lead the researcher to conclude that ownership is the determining factor for differences that drive performance.

Figure 6.3 Actual Explanations



6.4.3 Key Limitations

Though the evidence is not conclusive, the general findings above suggest that ownership is ultimately responsible for fostering the differences in culture, operational management and financial management that in turn explain the superior performance of ISTCs over NHS TCs in England. These findings are in line with economic theory. The literature review showed that a transfer of ownership from the public to the private sector, or vice-versa, is generally associated with some change in the types of incentives a firm and its employees face. These differing incentives, in turn, have a significant impact on firm behaviour and performance.

However, there are a number of potential limitations to these findings. The enquiry found that, at the time of study, England's NHS was undergoing immense pressure. The on-going changes, which may be the greatest since the inception of the NHS, undoubtedly had some effect on the findings. Further, a number of the NHS TC interviews took place during the end of the fiscal year, as the Trusts were attempting

to meet wait list targets so as not be in breach. As a result, there is a cyclical aspect to the operations of NHS facilities which may not have been captured.

We should also caution that the differences may lie in the fact that ISTCs have not yet had time to develop an entrenched culture. As a result, cultural practices are still quite fluid, whereas, within the NHS, practices have been ingrained overtime. It is likely that as the ISTCs come of age, medical practices may shift more toward ingrained behavioural patterns. This suggests that the comparison may not be unbiased.

There may also be some endogeneity with respect to the use of consultants. The ISTCs were not allowed to hire consultants that had worked for the NHS within the past six months. As a result, most, if not all, of the ISTC consultants were from overseas while NHS TCs used NHS consultants. As a result, some of the findings may be specific to the types of consultants that are on staff.

The literature suggests that the level of regulation and competition in the market may actually intervene in the relationship between ownership and efficiency. We have highlighted the differences in regulation between the ISTCs and NHS TCs. It can be argued that the regulatory environment in which the ISTCs must operate is more onerous (e.g. additionality, performance reporting, etc). Further, with respect to competition, the ISTCs were implemented to add capacity in certain areas, as well as bring competition to the market. The NHS TCs were merely intended to add capacity. As a result, if anything, the ISTCs should be operating in more competitive markets.

There is also the potential that issues within the NHS are much more complex than what can be observed. The researcher was focused on internal efficiency, which the independent sector is clearly handling very well. However, the NHS has a larger role to play in society and it is possible the researcher missed some of the bigger issues that the NHS struggles with in its day-to-day operations. An example would be an NHS directive from London that emergency patients need to be seen within a certain time period and as a result this affects the priority level of elective patient care.

Another issue is that, while ownership may be public or private, the respective organisation's employees may not be the same. For example, in a number of ISTCs, there are NHS consultants on secondment. Within the NHS facilities, there are NHS consultants seeing private patients. Here the incentives are not aligned with the organisations. However, broadly from the evidence there are very few private patients within the NHS Trust Hospitals and Treatment Centres seen by NHS consultants

practising in their off-hours as private consultants. Furthermore, NHS consultants on secondment are a minority within the ISTCs.

This relates to the issue of access to consultant employment contracts in the ISTCs and NHS TCs. These employment contracts, as well as any other related service contracts associated with these facilities, would be a valuable information source for assessing provider incentives and performance. At a minimum further information on the variable payment component between the consultants and the providers would allow for further detail on various incentive structures that may or may not be in place within these various facilities.

And lastly, we have peripherally discussed culture, often termed organisational culture. Clearly, if physical capacity was the only issue that mattered, it is likely the government would have continued to merely increase funding for NHS Trust Hospitals or even further contract with the incumbent private hospital market (BMI, BUPA, Nuffield, etc.) to deliver the care needed. However, as a strategy, the Department of Health's treatment centre program has encouraged new market entrants and these entrants are an integral part of the NHS decentralisation process.

Broadly, whether or not it was intended to do so, the decentralisation of health care provisioning seems to be breaking up the traditional command and control health care economy and, with it, the NHS organisational culture. Further, the policy of additionality seems to be an accidental policy driver of breaking up the traditional NHS consultant monopoly.

6.4.4 Further Research

The above weaknesses may limit the comparability between the ISTCs and the NHS TCs in England. Further research is welcome in this area on a number of fronts: the actual medical provisioning and quality outcomes; the various incentives or disincentives that drive the NHS and its consultants; a survey of patients who have received care within the independent sector and how their attitudes have changed; and research on the impact of the independent sector on the organisational culture of the NHS.

Given that the qualitative analysis indicates one very important issue with respect to the NHS TCs is the extent of their integration with the workings of the parent NHS Trust Hospital, and the attendant pressures (e.g. waiting list and financial concerns), further research should be conducted in this area. Specifically, the research should

analyse further the activity and performance of the NHS TCs which are stand alone versus the less autonomous NHS TCs that more physically and operationally integrated with the respective NHS Trust Hospitals. Important performance indicators to assess would be data on case mix, staffing ratios, management practices and ALOS. Then by comparing the differences, if any, not only do we have like for like comparisons between the NHS TCs and ISTCs but also we can then assess how much of a difference this physical and organizational integration impacts upon performance of the NHS TCs.

6.5 Summary

The evidence from the previous chapters suggests that the differences in the findings are a result of ownership. However, the issue is not simply that ownership matters, but how it matters. Ownership in health care organisations is different than in other sectors because of the nature of health systems. The researcher theorises that there are a number of potential reasons for these differences: the competitive effects in the market; different payers and payment methodologies; the independent sector may actively select patients with lower risk than the NHS TCs; the physical and organisational integration or the lack thereof; or in fact ownership itself.

Though the evidence is not entirely conclusive, differences in the operational and financial management practices of the ISTCs and NHS TCs suggest that ownership is the determining factor for these differences. By virtue of their different ownership, ISTCs have more autonomy, more internal accountability of employees to management and can claim residuals. These all create a difference in culture of the organisation, which also comes out in a number of difference cases. This conclusion is in line with economic theory. The literature review showed that a transfer of ownership from the public to the private sector, or vice-versa, is generally associated with some change in the types of incentive a firm and its employees face. These differing incentive, in turn, have a significant impact on firm behaviour and performance.

Some may still argue whether these differences are really due to ownership - the NHS has a significant number of additional responsibilities and pressures that the ISTCs do not have. Clearly, it can be argued that the NHS has responsibility over the public health system in general. However, if the basic premise is that ISTCs and NHS TCs are intended to select and admit the same types of patients, use the same technology and offer the same treatments, then why do they not operate in the same manner?

PART IV

Conclusions

Chapter 7: Conclusions

Chapter 7

Conclusions

I am as old as the NHS...and I am going to outlive it.[1]

NHS Registration Clerk, March 2007

7.0 Introduction

The comment above illustrates the scale of the changes currently taking place within England's NHS. The English NHS is undergoing massive reforms, some of which people fear will make the NHS unrecognizable. While the comment is one of exasperation, it also demonstrates that the government's reforms are shaking things up, a view supported by the conclusions of this dissertation. In many of the interviews, NHS staff and employees recognised that, while change was difficult, it was also necessary and many held the long-term view that the reforms will take hold and the ideals of the NHS will stand.

This chapter is divided into five sections. Section 7.1 provides a brief review of the research questions and England's on-going reform efforts in this area. Section 7.2 provides a summary of the principal results. Section 7.3 discusses the policy implications of the results. Section 7.4 discusses the key limitations of the research and suggests areas for further research. Section 7.5 discusses the next steps in the government reform efforts.

7.1 The Context and Review of the Research Questions

The dissertation assesses the Treatment Centre Programme as part of England's NHS reform efforts. Though the Treatment Centre Programme plays a relatively minor role in England's NHS in terms of patient volume and spending (both <1%), the attention drawn to it has been immense and the initial impact has been quite substantial. It should be noted that while there are Treatment Centres in Scotland, Wales and Northern Ireland, this dissertation focuses on the Treatment Centre

[1] Personal Communication, March 2007

Programme in England. Therefore, references to the NHS are intended to refer to the English NHS.

The Treatment Centres are overtly touted as part of a government strategy to add capacity, as well as improve quality and access to care (Department of Health 2005). The Treatment Centre Programme in England focuses on elective short-stay surgeries. Supporters of these types of facilities argue that the focused approach can improve quality and reduce costs. Opponents argue that these facilities will significantly impinge on the continuity of care, increasingly fragmenting the health system and reducing training opportunities for the next generation of medical practitioners (Royal College of Physicians 2003; UNISON 2005; 2006). Most, if not all, of these concerns, have been directed especially at the inclusion of the independent sector.

There are two types of treatment centres in England: Independent Sector Treatment Centres (ISTCs) and the NHS Treatment Centres. The first wave of ISTC tenders is eventually projected to deliver care to an additional 250,000 patients each year. In addition to these ISTCs, there NHS Treatment Centres, managed by the National Health Service (NHS) which are projected to deliver care to an additional 170,000 patients each year (Commercial Directorate 2005; CBI 2008); Department of Health 2005; Timmins 2005; UNISON 2005; Department of Health 2009).

The Treatment Centre Programme should not be regarded as merely the 'topic du jour.' The programme is emblematic of an emergent, and increasingly conflictual, intersection of policy, economics and business. From a policy standpoint, questions arise over efficiency, equity, quality and choice, even as the government faces pressures to keep costs to a minimum. From an economic standpoint, questions arise over new and increasingly market-oriented ways to finance increasing demand, largely via the pricing mechanisms of competition and choice. From a business standpoint, questions arise over whether the exact nature of the relationship between the public and private sector. Because the treatment centre programme touches on all these issues, it has received a disproportionate amount of attention, relative to its size.

7.2 Summary of the Principal Results

This dissertation focuses on whether the Treatment Centre Programme can be an effective policy mechanism for attaining a national health system's goals and objectives. The overriding theme of this dissertation has been the assessment of the evidence related to the Treatment Centre Programme in England with the view to

determining whether the Independent Sector Treatment Centres deliver higher performance than the NHS Treatment Centres and, if so, why.

The research is geared to providing answers to the following sub-questions:

- Are there differences between the ISTCs and NHS TCs in terms of efficiency?
- Are there differences between the ISTCs and NHS TCs in terms of quality?
- Are there differences in the organisational, managerial and technological approach between the ISTCs and NHS TCs?
- If such differences exist, how can they be explained? In particular how does the difference in their ownership structure relate to the differences in performance found between the ISTCs and NHS TCs? Or could there be various alternative, or even confounding influences (such as competition), which may affect the conclusions suggested by the evidence?

7.2.1 Quantitative Evidence

Chapter 4 uses a quantitative methodological approach, with the intention of conducting an initial assessment on the specific issue of treatment centre performance. The purpose of the analysis is to test the hypothesis that there are differences in performance between the Treatment Centres. This analysis is not to explain causation or attempt prediction, but rather to obtain initial correlations and establish whether there are differences in performance. This chapter is to support the initial hypothesis and justify the rest of the thesis through ensuring that there are differences to explain between the ISTCs and NHS TCs in terms of efficiency and quality.

Because the Treatment Centre Programme encompasses not only ISTCs, but also NHS Treatment Centres (NHS TCs), we have an opportunity quantitatively to assess the performance of IS and NHS Treatment Centres alongside NHS Trust Hospitals and Independent Sector General Hospital Providers and as a result uncover whether there are advantages in terms of efficiency and quality that may be associated with differing ownership structures (public or private) and facility type (treatment centre or hospital).

An initial analysis was undertaken by reviewing basic descriptive statistics (number of cases, mean, median, etc.) and then by pooling the mean differences between groups. Multivariate regression analyses were then undertaken in order to assess the predictive value of these mean differences, to control for potential

confounding factors and to determine the significance of variables such as ownership status, treatment centre focus, age and deprivation.

The descriptive analysis indicates that there are differences in the ALOS between facility types. The differences are not as strong when assessing the day case rates. Broadly, the data suggests ISTCs have better efficiency indicators, followed by Private Hospitals, NHS TCs and then NHS Trust Hospitals. From the quality outcomes standpoint, there is very little difference in the death rates between all providers. Readmission rates are lower in the ISTCs. The NHS TCs were slightly better than in the Private Hospitals (by number of procedure areas) with NHS Trust Hospitals having the highest readmission rates within these HRGs.

From the difference in means analysis, the data suggests that there are differences in efficiency performance. Broadly, we see that ISTCs tend to have higher performance levels (as measured by lower ALOS) than all other providers. NHS Trust Hospitals have the lowest performance. IS Providers perform better than NHS TCs. The data indicates that the evidence is even stronger when limited to inpatient cases.

The difference in means analysis suggests that ISTCs tend to have higher performance levels (as measured by lower ALOS) than all other providers. NHS Trust Hospitals have the lowest performance. IS Providers perform better than NHS TCs. The evidence is even more profound when limited to inpatient cases (and taking out outpatient procedures).

Day case rates were also assessed. We see that the day case rates are highest for NHS TCs and NHS Trust Hospitals, followed by ISTCs and then Private Hospitals. However, there are significant limitations to this analysis in that two procedure areas account for 90% of the number of cases and significant differences when comparing providers and their number of cases. Further, the day case rate only estimates whether the procedure was a day case or not, dampening the actual range and variance between providers.

With respect to quality outcomes, we see very little, if any differences, between the providers. Though we are not able to say that quality outcomes are better in the ISTCs and NHS TCs, they do not appear to be worse. Thirty day death rates and inpatient readmission rates are used as proxies for quality outcomes. We see no statistically significant difference in 30 day death rates. Also, broadly we see no statistically significant differences inpatient readmission rates. The results are only

significant when ISTCs are compared to NHS Trust Hospitals (ISTC < NHS Trust Hospitals).

We have also assessed potential differences in age and deprivation, with a view that these may point to differences in case mix. We found very little, if any, difference between providers. Broadly, there is very little difference between the providers in the age of their patients. In all comparisons, except for the comparison of IS Providers and NHS Trust Hospitals, the data is statistically insignificant, with the confidence intervals crossing zero. Deprivation scores differ very little as well. The evidence is only statistically significant when comparing ISTCs and NHS TCs (ISTCs have lower deprivation levels) and when comparing NHS Trust Hospitals with all the other provider types (NHS Trust Hospitals tend to have slightly higher deprivation scores).

Theory suggests that we should see differences in performance arising from differences in ownership. Theory also suggests that facilities providing a more focused approach should have better performance. With respect to efficiency, as measured by ALOS, the evidence indicates this to be true. There are differences in ALOS based upon facility ownership. With respect to quality outcomes, we see very little evidence of differences. However, at the same time, we can say that, while quality outcomes may not be better, they are certainly no worse, as was feared when the Treatment Centre program initially proposed. Generally speaking, that evidence indicates that ownership structure plays a stronger role in determining performance than the type of facility when looking at ALOS as a proxy for efficiency. However, the weighted means difference analysis does not provide information on the relative weights we should put on the 'type of facility' and 'ownership structure' variables, when evaluating their roles in improving performance. As a result, the researcher conducted a basic regression analysis to assess in more detail the relationships between average length of stay and the independent variables.

The regression was run once for each type of procedure and showed varying levels of explanatory power for different procedures. Broadly, we find ownership to be the strongest predictor in the model. In three out of the four cases, ownership is significant and in two out of four cases ownership is the strongest predictor. Facility type (Treatment Centre or Hospital) is a stronger predictor in one case and in one case it is nearly equal with ownership. As we more closely assess cases that are inpatient cases, we see significant differences, and that ownership has the largest coefficient. While the control variable of age and income deprivation are generally significant,

they do not have very high coefficients, indicating they are not especially important, at least compared to the type of and ownership of a facility.

Overall, the model does not appear to be successful in predicting length of stay as there is well over 90% of the variation in length of stay unaccounted for (i.e., predicted by other factors than ownership, facility type, age and deprivation). However, the regression analysis does support the evidence from the difference in means analysis that ownership indeed is an important difference in performance between hospitals and treatment centres.

There are key limitations to the quantitative approach, such as the data available, gaps and inconsistencies in reporting between IS and NHS providers, the methods used, HRGs not being directly linked to financial remuneration for the majority of providers assessed and the HRG groupings not sufficiently refined to account for variations in complexity in the individual patients and total case mix of the respective facilities. However, as noted in Chapter 4, there are certain limitations to the case mix adjustment with only two types of variables being used for assessing provider case mix. As a result of these limitations, the qualitative chapters look more deeply into the Treatment Centre Programme to further investigate why there may be differences in performance between the treatment centres and between the different ownership structures.

7.2.2 Qualitative Evidence

Based on the quantitative analysis in Chapter 4, it can be argued the form of ownership is an important determinant of treatment centre performance. The two qualitative analysis chapters attempt to ascertain why ownership matters, or, at a minimum, why the predictive power of ownership is strongest amongst the independent variables assessed.

The first of the qualitative analysis chapters assessed the performance of Treatment Centres over traditional facilities in the independent sector and NHS, while the following chapter examined the effects of ownership structures in ISTCs and NHS TCs. Rather than leaving the mechanisms that explain why ownership is correlated with performance in a 'black box', as is common in statistical analyses, this dissertation has conducted original qualitative research in a bid to better our understanding of the links between ownership and performance outcomes.

Treatment Centres – Independent Sector and NHS

The first qualitative analysis chapter, Chapter 5 tried to identify exactly what were the proximate factors that explained the differences in outcomes. It identified organisational, managerial and technological differences between the treatment centres.

Site visits and interviews were conducted at seven ISTCs and nine NHS TCs in England. This amounted to approximately one-third of the ISTCs that were fully operational at the time and one-quarter of the NHS TCs. Two NHS Trust Hospitals were also visited to differentiate NHS TCs from NHS Trust Hospitals and thus provide a fuller picture. In total, 18 site visits were conducted.

The selection of the case studies was based upon two criteria. First, an ISTC from each of the major groups, or chains, owning and operating the treatment centres, was to be interviewed. Second, due to the broad variety of NHS TCs which were in operation, a number from both stand alone, as well as NHS Trust Hospital integrated, were selected as case studies.

The primary method of data collection was the semi-structured interview format. Site visits and interviews were conducted in 2007 and 2008. The initial interviews were conducted with a consultant of the NHS Elect during two day site visits. These initial interviews provided background so that subsequent interviews with treatment centre staff could be narrowed to the essential issues pertinent to the research. These initial site visits included the two NHS Trust Hospitals. Though the purpose of this qualitative analysis was to assess the evidence for apparent differences found between IS and NHS Treatment Centres, these initial interviews also allowed for comparison of NHS Trust Hospitals from NHS Treatment Centres.

The evidence suggests that there are clear differences between ISTCs and NHS TCs. These differences can be broadly categorised into three groupings: differing organisational methods; different skill mix in staff; and management practices.

The interviews found that management structures in ISTCs were relatively streamlined, whereas in NHS Trust hospitals, the departmental structures were relatively top heavy. In the ISTC management reporting was clear; but it was not always clear in the NHS whether staff reported to a treatment centre manager or to the NHS Trust Hospital itself, implying that the treatment centre was seen merely as another clinical department.

In general, there is less staffing in ISTCs than NHS TCs, which suggests higher efficiency on a staff per patient basis. One could also infer overall lower staffing costs. However, it must be noted that treatment centre operational cost data was not assessed due to the confidentiality of these figures.

There was concern that ISTCs would use less experienced consultants, but no difference was found between the independent sector and NHS. Maximising the use of a treatment centre's assets depends on how operating theatre time is scheduled. Generally ISTCs seemed to make more efficient use of their operating rooms and staff.

Though the intent of how ISTCs and NHS TCs were to operate was relatively similar (e.g. admission criteria and discharge policies), in practice, ISTCs and NHS TCs differed significantly. The overwhelming evidence found that ISTCs were much better at selecting appropriate patients and were much more effective in booking operating rooms to full utilisation. NHS TCs were found mixing non appropriate patients and practising in the same manner as a general hospital. ISTCs were more effective at setting patient expectations early, thus allowing for the patients, their families, and the PCTs to plan for discharge at, or even prior to, admission.

Transporting patients to and from the operating theatre is also an important part of ensuring proper flow in and out of the operating theatre and ensuring maximum throughput. Since the ISTCs were relatively small and self-contained facilities, it did not take more than a few minutes to get the patient from the ward to the induction room, but in the NHS TCs, this was not always the case.

Differences were also found in the areas of purchasing and materials management. Most ISTCs were able to get consultants to use the same product company, permitting larger discounts and a greater ability to save on purchasing. NHS TCs had difficulty getting consultants to use the same product company. It was stated in the interviews that purchasing costs at ISTCs were significantly below the NHS purchase price.

Differences were also found in the architectural design of the facilities. The ISTCs visited were designed for the services they were to provide (purpose built). This was not the case in a number of the NHS TCs, and was an important limiting factor in stream-lining treatment centre operations. Furthermore, this physical organisation with the NHS Trust Hospitals has an important drawback on the actual operations. Systemic delays within the entire NHS Trust Hospital trickled down to delays within the treatment centre. This is a phenomenon the researcher noted in many instances.

Though the evidence cannot be conclusive by its nature, differences in the organisational and management practices in the ISTC and NHS TCs that affect performance in terms of efficiency and quality suggest that there is a clear divergence in operating practice between the ISTCs and NHS TCs.

Ownership: How Does Ownership Matter?

Chapter 6 took the argument a step further by trying to identify the causes of those differences – and in particular the role of ownership. By doing so, it was hoped to disentangle the correlations identified in the quantitative results and to gain insight into the causal relationships involved.

Economic theory gives us a number of possible explanations for the differences identified in the previous chapter. These differences may be due to the competitive effects in the market. They may be due to differences in payers and payment methodologies. The independent sector may actively select (e.g. age, severity, etc.) patients with lower risk than the NHS TCs. Physical and organisational integration may account for differences in performance.[2] And lastly, the operational and financial management practices within ISTCs and NHS TCs may differ because of ownership. If these last factors do help explain differences in performance, then private ownership generates greater productive efficiency, as theory would predict.

Rationale 1: Competition May Explain the Difference in Performance

Direct competition between ISTCs and NHS TCs does not explain the difference in performance. From the site visits conducted, the only instance where there may be competition between an ISTC and NHS TC would be between ISTC D and NHS TC GG. However, in this case, the only overlap in procedures provided was orthopaedic surgeries. As a result,, there is very little, if any direct competition. Also, from the geographic competition analysis we cannot say that competition is a potential confounding factor to the evidence between the ISTCs and NHS TCs. And further, the ISTC and NHS TC competition areas do not overlap.

Further, there is nothing to suggest ISTCs and NHS TCs face significantly different competition, even if they do not compete against each other, such that it could explain the differences found in the performance of NHS TCs and ISTCs. For

[2] For historical reasons, a significant proportion of NHS TCs are physically as well as organisationally integrated with an NHS Trust Hospital, while ISTCs are, for the most part, stand alone centres (physically and organisationally). In this case, ownership is simply a proxy for this history.

the most part, ISTCs have been situated in areas outside of major cities, whereas the NHS TCs are situated in and around major cities. Therefore ISTCs should face less competition than the NHS TCs.

Still, it could be argued that the ISTCs are under more competitive pressure overall due to the inherent nature of contracting with the Commercial Directorate as well as that they compete against NHS Trust Hospitals for patients. However, then we would have to then assume that the NHS Trust Hospitals are under this same competitive pressure which should be reflected in their performance indicators. This is not the case as NHS Trust Hospital performance indicators, broadly, are lower than the NHS TC indicators.

Rationale 2: Payment Methodology May Explain the Differences in Performance

We cannot say that differences in payment methodology account for differences in performance. ISTCs and NHS TC providers both treat NHS patients and as a result, the payer (NHS) is the same. Further, both IS and for the most part NHS facilities are paid via a budgetary payment.

The ISTCs are receiving a 11.2% premium above the NHS Equivalent Cost, however, the ISTCs need to cover both their operational as well as capital costs with this payment. The ISTCs do not receive an additional budget allocation for capex like the NHS TCs.

There are a number of other reasons for why the ISTCs should receive a premium payment. These include the fact that the contracts are only for five-years with no commitment for renewal, unlike the NHS, where these contracts are open ended. There is no risk transfer in capital costs to the NHS. And there are tax issues, which the NHS does not have to consider. As a result, considering the above mentioned risk factors, the premium is not excessive.

Rationale 3: ISTCs Lower Case Mix Selection May Explain the Difference in Performance

Another explanation for the differences in performance is that the independent sector actively selects patients with lower risks than the NHS TCs. The researcher concludes that this explanation cannot be true. The entire business model of a treatment centre revolves around selecting patients that are appropriate for outpatient, day case or short-stay surgery. The researcher reviewed the admissions policy and

then the actual practices of the ISTCs and NHS TCs. The admissions policies were more or less the same between the ISTCs and NHS TCs. The evidence suggests that elective care patients appropriate for the NHS TCs are no different in case mix complexity than within the ISTCs. As a result, it cannot be argued that ISTCs are actively selecting patients with a lower case mix complexity.

However, from the qualitative evidence it is clear that the NHS TCs, due to pressures from the NHS Trust Hospital and scheduling of the consultants, allowed for non-appropriate patients to enter the facility. Time and time again it was found that NHS treatment centres were admitting non-appropriate patients to the treatment centre. The ISTCs did not accept non-elective surgical patients, nor did they accept medical patients, which were found in one NHS TC. However, the fact that non-appropriate patients were admitted to NHS TCs cannot explain the differences in performance identified in the quantitative chapter. Of the elective HRG admissions policies from the qualitative analysis and discharge records from the quantitative analysis, the patient cases are very similar with little significant differences in age and deprivation (IMD) scores.

Rationale 4: Integration May Explain the Differences in Performance

The researcher found that there were not great differences in the use of technologies between the independent sector and NHS. However, there are clear differences between the ISTCs and NHS TCs in the how technology was organised in daily operations. These differences include the location of the technology and how it was integrated into the operations of the facility. Specific examples are provided with the PACS, consultant notes and the diagnostic imaging facilities.

Diagnostics in NHS TCs were not thought of as an important component of the treatment centre and their impact on the facility's operational flow was not properly considered. Six (6) of the nine (9) NHS TCs shared diagnostic services with the NHS Trust Hospitals, whereas all of the ISTCs had their own self-contained unit. Systemic delays within the entire NHS Trust Hospital trickled down to delays within the treatment centre.

Further, the ISTCs were set up to function as operationally stand alone facilities. Six of the nine NHS TCs facilities were physically integrated with the NHS Trust Hospital and in all but one of the NHS TCs, the organisation was beset by cross-staffing and shared resources with the Trust Hospital. The close, or even physical

integration with the Trust Hospital facility may impact the operations of the treatment centre.

However, though this may explain some differences in performance, it cannot explain all of them. Stand alone NHS TC facilities were still similar to the integrated NHS TC facilities in their organisational structure, skill mix, staffing ratios and management practices. The evidence overwhelmingly suggests that consultants are using the treatment centre operating theatres for the same patient case mix as in the NHS Trust Hospital operating theatre. Anaesthetists are using the same anaesthesiology, irrespective of whether the surgery could be done on a day case or inpatient basis. The use of anaesthesia, and the potential for using different types based upon whether a patient is a day case or inpatient, is important to how quickly patients recover and can be discharged from the facility.

Rationale 5: Ownership May Explain the Difference in Performance

The evidence suggests that the fifth reason - differences in the operational and financial management of the ISTC and NHS TCs - is the most likely reason for differences in performance. If so, then ownership is the important distinction. For ownership is intimately related to those differences. The evidence suggests that there are differences between the ISTCs and the NHS TCs in their use of technology, integration of the patient pathway, organisational methods such as management structure, consultant reporting, perception of management control, the skill mix in staff and staffing ratios, as well as the management practices in terms of admission to discharge.

It must be noted that all the private operators were new market entrants. It is therefore important to disentangle the various owners' differences in terms of their strategies and motivations since these drive management decision-making and working patterns, which may, in turn, impact the evidence observed. In all cases, either the UK was a new market, as in the case of the foreign owned firms, or the sector was a new one, as in the case of the UK operators. In the latter, instance, the UK operators (Care UK and Mercury) then partnered with sector specific operators to better leverage their respective expertise for operating a treatment centre.

It is also important to note that the ownership structures of the ISTCs researched have changed since the projects were tendered. Changes in ownership were accelerated with the advent of private equity taking a particular interest in health, with

ownership changes further accelerated by the liquidity in the markets, which facilitated major health deals. For example, Apax Partners, a private equity firm, bought Capio in 2007 and they were a major investor in Netcare. The motivation for the private equity firm was to gain access to the market and create economies of scale.

This is consistent both with the Department of Health Commercial Directorate's strategy to build a competitive market and is in line with the planned size and scope of the Wave 2 tenders. In evaluating the size of the ISTC market required to create and sustain a competitive market in terms of both price and quality, the Commercial Directorate looked at two key aspects: the number of competitors required in a given market and the minimum size that a provider would need to be to provide national coverage.

Though the providers may have had differing competitive advantages, all the strategies adopted had to incorporate the necessity of entering the UK market for the long-term. All the operators saw that a 5 year contract would only break-even on their return on investment. They sought to increase the contract value, and as a result, the strategy was longer term. With that said, the entry of the private equity providers (Apax partners), may have altered the incentives. Though the private equity firms were also profit maximising, which was almost certainly the same goal as the other firms, the time-frame for private equity players is typically much shorter (5 years or less).

As a result, the dynamic and the incentives of the private equity players must be taken into context alongside the other private operators. However, the influence of the private equity firms cannot be said to affect the results of the research, since these purchases, liquidity has dried up in the markets and a number of private equity firms are having to sell or consolidate, and the exit time frame may now be different than originally envisioned. The differing time-frames for investment, as well as other differences are important, if 'under the surface', and a recognition of these motivations is important if one is to disentangle the contribution of private sector ownership from, for instance, the importance of being able to insulate elective surgical work from other pressures.

All the ISTC owners were new market entrants with various competitive advantages. The US and Canadian firms had particular expertise in operating treatment centres from the management as well as clinical side. The South African firms had the ability to recruit staff at a lower cost of labor. Capio, a Swedish firm,

had both operator experience as well as the ability to recruit staff from Sweden. All had the ability to set clear management expectations due to the inherent structure of these facilities and the use of staff from outside of the NHS. Finally, The UK firms had local market expertise, but not sector specific expertise.

Yet, despite the potential for differing firms to exploit unique comparative advantages, the strategies adopted were more similar than different, especially when compared to the NHS TCs. Property rights theory argues that the incentive structure is importantly impacted by property rights, and the similarity of the strategies adopted by the privately owned ISTCs may indicate that ownership is a more important factor than the geographic, regulatory, and experience contexts of the firms.

Summary

The evidence from the previous chapters suggests that the differences in the findings are a result of ownership. However, the issue is not simply that ownership matters, but how it matters. The qualitative evidence shows that there are differences in the actual organisational structure and operations of these treatment centres which affect performance and suggests that ownership is indeed the determining factor for these differences. Due to the methodological approach of the dissertation, and the limitations of the quantitative data, the evidence cannot be entirely conclusive as to how and to what extent this links back to differences in the quantitative evidence.

This conclusion is in line with standard economic theory. The literature review showed that a transfer of ownership can be expected to be associated with some change in the types of incentives in a firm, and these different incentives are likely to have significant effects upon firm behaviour and performance.

Some may still argue whether these differences are really due to ownership - the NHS has a significant number of additional responsibilities and pressures that the ISTCs do not have. It can be argued that the NHS has responsibility over the public health system in general. However, if the basic premise is that ISTCs and NHS TCs are intended to select and admit the same types of patients, use the same technology and offer the same treatments, then why do they not operate in the same manner?

7.3 Policy Implications of the Results

There are two kinds of policy implications uncovered from the research that must be put into perspective as the NHS moves forward with its reform efforts:

- Those arising directly from the research results:
    - Private ownership can and does improve performance; if performance improvement is the aim, private sector participation in public health service provision should be expanded;
    - NHS TCs should be physically and organisationally independent of NHS Trust hospitals;
    - Clinical staffing policy and the additionality principle should be improved to remedy skill shortages;
    - Benefits of new entrants to the NHS market should be encouraged;
    - Independent Sector Innovations Should Be Encouraged and Important Lessons Should Be Drawn for How NHS Providers Implement these Innovations such as in the Treatment Centres;
    - The ISTC programme should be continued or expanded because of its ability to change the existing NHS organisational culture.
- Those that are not a direct outcome of the research results, but became apparent from conducting the research:
    - Performance monitoring should emphasise outputs and outcomes;
    - National data needs to be improved so that public and private facilities can be more easily compared;
    - Incentives in the NHS should be better aligned;
    - Competition should continue to be promoted, to incentivise providers.

7.3.1 Policy Implications: Directly Related to the Research Results

Policy Proposal 1: Private Ownership Can and Does Improve Performance; Private Sector Participation in Public Health Service Provision Should Be Expanded.

Policymakers should consider increasing private sector participation in the provision of public health care delivery. The evidence in this dissertation suggests that ISTCs have superior performance relative to NHS TCs. The evidence also suggests that even if the NHS TCs were operating in the manner they were intended to operate, there would still be differences in performance based upon facility ownership.

Private ownership can encompass not-for-profit (NFP) and for-profit entities. The important distinction is that these entities are fully responsible for financial and operational performance. In theory, incentives are aligned to earn revenues, monitor

and maintain performance, and expand or at least retain market share (Harding and Preker 2003). Depending on the country, NFP hospitals can pay an important role in the provisioning of care. In the US, for example, NFP hospitals account for 70.3% per cent of beds in the health system (AHA 2005), whereas in the UK, for-profit and non-for-profit (voluntary) beds amount to only 11% of total acute care beds, of which the majority are under the management of the for-profit acute care facilities (Hensher and Edwards 1999).

The UK government already recognises that ownership matters, or at minimum, recognises the basic characteristics of the how differences in ownership structures matter in performance outcomes (e.g. clear management accountability, decision rights, etc). Already, we see that there are changes in the ownership structures of NHS Trust Hospitals that become Foundation Trust status, and thus becoming corporatised units. Corporatization refers to the adoption of management structures or other features and behaviours employed by corporations, while the state, not investors on the stock market, retains ownership of the company's shares. Foundation Trust status allows hospitals a significant amount of managerial and financial freedom, when compared to existing NHS Trust Hospitals.

As discussed in the literature review, the evidence makes clear that ownership of a firm has significant effects on a firm's behaviour and performance. The effect of a change in ownership is driven by a change in the objectives of the owners of the firm (public or private) and the incentive arrangements in place for management. However, it is important to note that efficiency and the incentives within each firm are not solely dependent on changes in ownership structure. Efficiency and the incentives are also dependent on the level of competition and the regulatory environment in which a given firm operates. Policy suggestions on competition and the regulatory environment will be made in the following sections.

Policy Proposal 2: NHS TCs Should Be Physically and Organisationally Independent of the NHS Trust Hospitals.

In order for NHS TCs to ring-fence their services and focus exclusively on elective care, they need to be physically and organisationally separated from NHS Trust Hospitals. The ISTCs were set out to function as operationally stand alone facilities. Six of the nine NHS TCs facilities, on the other hand, were physically and organisationally integrated into NHS Trust Hospitals, and all but one of the NHS TCs

were beset by cross-staffing and shared resources. The close, or even physical integration of NHS TCs with Trust Hospital facilities may impact the operations of the treatment centre.

The first ramification of integration with Trust Hospitals is that most NHS TCs are not being used as intended, that is, as treatment centres. The evidence overwhelming indicates that NHS TCs mix appropriate patients with inappropriate ones, and mix dedicated treatment centre staff with staff from the Trust hospital (the latter tend to operate in the same manner as they would in the general hospital). The evidence also suggests that NHS TCs that are physically linked to NHS Trust Hospitals have more difficulty operating in the way intended and thus have poorer performance levels.

The ISTCs are predominantly stand alone entities with dedicated staffing and patients. These ISTCs do not accept non-elective surgical patients, nor do they accept medical patients, which we found in one NHS TC. Particular emphasis was given to comparing ISTCs and NHS Treatment Centres, as both types of facilities attempt to select the same type of patient.

Second, the NHS is transferring old habits and mindsets to the new, renovated facilities. Because of this, the culture in the NHS TCs is very similar to the culture of the general NHS, constraining the ability of the treatment centre to transform the system. The evidence overwhelmingly suggests that consultants are using the treatment centre operating theatre for the same patient case mix as in the main hospital operating theatre. Anaesthetists are using the same anaesthesiology, irrespective of whether the surgery could be done on a day case or inpatient basis. There are some instances of NHS TCs attempting to transform themselves and operate as they were intended. However, these cases have been very limited. Broadly, the NHS is merely transferring old habits and views to the new facilities, resulting in very little transformation of the system.

Third, there appeared to be a significant amount of political pressure within the NHS while the research was being conducted. This pressure emanated from the mandate to hit wait list targets. A number of NHS staff stated that operations had been recently oriented as a reaction to this directive. All pro-active planning was being set aside for the time being, in order to get patients through whatever operating theatre was available on a given day.

The ISTCs were even feeling some of this sense of urgency. One ISTC even commented that they were receiving calls on a weekly basis from the Commercial Directorate. The ISTCs visited were achieving their volume contracts and were even adding contracts and volumes. The ISTCs seemed to be somewhat protected from NHS politics, since they were not affiliated with an inpatient hospital and because they had dedicated treatment centre staff who remained focused on ramping up volume levels.

Further, it was found that NHS Trust Hospitals in breach, or close to breaching, their wait list targets, put further pressure on the NHS TC to admit non-appropriate patients, so that they could meet their year-end targets. As a result of the close physical integration with an NHS Trust Hospital and the pressures to achieve wait list targets, these treatment centres were the most poorly run.

And lastly, in only two of the nine NHS TCs was there a dedicated facility manager. Within the nine NHS TCs, consultant reporting was unclear in three of the facilities and in a further four the reporting was to the department head of the Trust Hospital. The evidence suggests that the correlation between NHS TC integration and accountability was strongly negative.

It can be argued then that there are two important reasons for 'ring-fencing' the treatment centres within the NHS. First, this allows for the treatment centre to remain focused on their operational and clinical approach. Secondly though, it keeps the treatment centre insulated from the on-going NHS Trust tensions, which would otherwise overflow into the treatment centres as a result of the need to meet benchmarks and implement new policy.

Policy Proposal 3: Clinical Staffing Policy and the Additionality Principle Should Be Improved To Remedy Skill Shortages.

More can be done to ensure the treatment centre programme alleviates the shortage of skilled staff that the public demands. Adequately skilled ISTC staff is vital to the quality of care that these facilities provide to the NHS patients.

An interesting component of the ISTC programme is that the ISTCs were subject to the Department of Health's 'additionality' policy. The overriding concern was that the ISTCs would merely poach NHS consultants from the NHS Trust Hospitals, undermining the NHS' goal of adding capacity to the health system in order to reduce wait lists. To mitigate against this concern, the Wave 1 tenders mandated that ISTCs

could not hire consultants who had worked for the NHS within the past 12 months. As a result of this limitation, ISTCs had to seek out consultants from outside of England in order to maintain adequate staffing levels. It must be noted that this was not a requirement for NHS TCs.

The policy of additionality within the ISTC programme has had a number of important knock-on effects, one of which has been to break up the NHS consultants' traditional monopoly. The policy of additionality has had the effect of not only bringing in new cultures and ways of providing health care services, but also of upsetting the traditional dynamic of the NHS consultant. Traditionally, NHS consultants would work a number of operating theatre sessions totalling 40 hours in a week, for which they would be paid a fixed salary by the NHS. In off hours, NHS consultants could work for the private sector. Such an arrangement is beset with cross-incentives or even disincentives.

Although it is too early to say that the NHS consultant power structure has been broken up, the research indicates that this is underway. The researcher views these new entrants as competitors to the status quo. Accordingly, it is important to recognise that the additionality policy affects not just the operational side of health care culture, but also the clinical side.

However, there are a number of policy issues that need to be addressed with the hiring of new staff from outside England. For example, recruitment processes in ISTCs are different from those in the NHS. Each ISTC has its own policies and procedures for the recruitment of different positions. For example, the employment status of the surgeons varies significantly. Some ISTCs use wholly seconded NHS medical staff, whose arrangements for employment, appraisals and continuous professional development remain with the NHS, while other use an employed workforce or even a third-party contracting arrangement.

Further, the recruitment procedures for specialists that ISTCs use are different from those used in the NHS. ISTCs are not required to use formal advisory appointments committees with royal college representation, while the NHS requires input from royal colleges and review by colleagues from within the same professional group (Healthcare Commission 2007) for its specialists.

There is also the issue of being able to compare the clinical skills of staff working in ISTCs. Staff recruited from different countries come with different training and experience, and the response of ISTCs to these differences varies. Some ISTCs try to

standardise practices, while others allow consultants to practice in their preferred manner (Healthcare Commission 2007).

There have also been concerns raised about the nature of short-term contracts held by overseas staff. Some clinical associations have suggested that these short-term contracts limit the ability of staff to become accustomed to standard UK practices, to establish the necessary relationships with NHS colleagues, and to be aware of postoperative complications in their patients (Healthcare Commission 2007).

There are also the questions of whether staff in the ISTCs have the same avenues for professional development as staff in the NHS. The continuing professional development at ISTCs varies (Healthcare Commission 2007). Furthermore, the short-term nature of a number of the consultant contracts may limit the interest in continuing professional development.

The policy of 'additionality' evidently has had a direct effect on ISTC staffing. 'Additionality' has created a barrier to integration by preventing the flow of staff between ISTCs and the NHS. There is an alternative model, using secondment of NHS consultants, but this model is not without its own problems. From the interviews, the ISTCs that used seconded staff stated that the poorest performing staff members were the NHS seconded consultants. The reasons were two-fold: NHS culture and inability to incentivise.

Policy Proposal 4: Benefits of new entrants to the NHS market should be encouraged.

The benefits of new entrants to the NHS market should be encouraged, in particular the ability to recruit new clinical staff, set clear management expectations and care processes, etc.

The ISTCs, as new market entrants, brought new clinical staff to the NHS. Though there was concern that ISTCs would use less experienced consultants, no differences in this regard were found between the independent sector and NHS. In all cases, the ISTCs hired only consultants which had experience for the procedures which they were contracted to provide. It must be stated that ISTCs may have more experienced staff since they generally do not make use of consultant trainees and hire consultants with little or no experience.

However, bringing in new clinical staff not only performs the function of adding additional capacity, but also the function of transforming existing practices and the

implementation of 'best practices' to ensure improved provision of care. A cited example was the use of patient control anaesthesia (PCA). The PCA would be shut off at 24 hours post operation as evidence suggests that leaving patients too long on the PCA slows recovery. Increasingly 'best-practices' point to getting the patients off the PCA as soon as possible, encouraging them to become mobile and thus be discharged from the facility. A number of the ISTCs were implementing this practice whereas the NHS TCs were merely transferring the same practices (e.g. the manner in which they treat inpatients) to a different facility.

In all seven ISTCs' cases, management and clinicians stated that they did not want to deviate too much from UK practices. Nonetheless, there were specific examples of ISTCs questioning the status quo and introducing new practices to the NHS in terms of differing mix of staff in the operating theatres. The use of differing mix of staff in the operating theatres has the direct impact of differing roles and responsibilities representing a systemic shift of practise, rather than merely transferring the old ways of working in a Trust Hospital.

Further, the new market entrants used other clinical and non-clinical staff in important ways that were essential to the operational performance of the treatment centres. For example, schedulers for operating theatre time were empowered in their positions, unlike within the NHS. This implies that the role of scheduler is a large one in determining operational efficiency. Another example is the use of operating department practitioners (ODPs). Typical staffing in a United States (US) ambulatory surgery centre includes two nurses, a scrub nurse and a circulating nurse. The function of the ODP, which does not exist in the US, is instead provided by the circulating nurse in the initial and final five to ten minutes of a procedure. The use of circulating nurses is being adopted by ISTCs, many of whom have incorporated US and Canadian practices in the operating theatre.

The ISTCs performed better in setting clear management expectations. The qualitative evidence found that management structures in ISTCs were relatively streamlined, whereas in NHS TCs, the departmental structures were under the NHS Trust Hospitals. Within the ISTCs, management reporting was clear. But it was not always clear within the NHS whether staff reported to a treatment centre manager or to the NHS Trust Hospital itself. The clarity of ISTC reporting structures means staff will be likely to have more clearly defined tasks and goals, and can more easily address problems that arise, since there is a clear hierarchy

There are evidently differing perceptions and attitudes toward management control in the different facilities. ISTC staff perceived that management had a higher degree of control than NHS TCs. Also, the evidence suggests there was much more of an integrative approach between the administration, nurses, surgical consultants and anaesthetist. This integration created the ability to incentivise the consultants much better than in NHS TCs.

The ISTCs evidently had much better care processes than were in place for a treatment centre. Upon review of the patient selection and admission documentation forms from ISTCs and NHS TCs, there was very little difference, but in practice, ISTCs and NHS TCs differed significantly. The qualitative evidence found that ISTCs were much better at selecting appropriate patients and were much more effective in booking operating rooms to full utilisation. NHS TCs were found mixing non-appropriate patients and practising in the same manner as a general hospital. Mixing non-appropriate patients is bad clinical practice which can lead to medical errors as well as the inability to treat patients appropriately if back-up medical support is needed. Fewer cancellations would suggest fewer patients having to return another day to the facility and staggered patient arrival times would allow for a smoothing of operations and not wait in line, suggesting higher patient satisfaction levels.

Discharge practices were relatively similar, both in theory and practice, though ISTCs were more effective at setting patient expectations early as well as having post-discharge care booked. This suggests that due to better ISTC integration with the PCTs, there is not only better operational flow, due to the ability of providing the full continuum of care, but also better quality with patients immediately receiving post-discharge care.

Since the ISTCs were relatively small and self-contained facilities, it did not take more than a few minutes to get the patient from the ward to the induction room, but in the NHS TCs, this was not always the case. Transporting patients to and from the operating theatre is also an important part of ensuring proper flow in and out of the operating theatre and ensuring maximum throughput.

However, care processes cannot often be assessed in a vacuum. The care processes is not merely when a patient is admitted and then discharged within a specific facility. Therefore, policymakers should consider greater integration of the independent sector into the health system, at least for certain aspects of the system. At

the same time, we must be cognizant that a balance be struck in this integration, as independence from the NHS is arguably what makes ISTCs so successful.

The integration of treatment should include the actual provisioning of care, such as patient discharge, follow-up and after-care. For example, for total joint replacements there is significant physiotherapy needed. The ISTC must work closely with the local PCT for rehabilitation services. Furthermore, there may be some further care in NHS hospitals required.

ISTCs discharge patients with information about how they should look after themselves, and with a contact telephone number that they can use for problems and queries. However, if patients experience problems after they have been discharged, their course of action is not straightforward. Day units at ISTCs are not staffed out of hours, and mobile units may have moved elsewhere. As a result, the better integration of the ISTC after patient discharge with the local provider network is essential.

Up to this point, most of the evidence has been focused on processes as they are intended to operate. However, what do ISTCs do when things go wrong? What are the systems in place for patients to be transferred to NHS facilities? Unsurprisingly, this is a question often asked by the government and NHS officials, and this was a concern expressed. It must be stated that there have been few validated adverse incidents reported by ISTCs.

Irrespective of the current outcomes, this has been a cause of resentment among some NHS staff, who felt that NHS hospitals would be 'picking up the pieces' when ISTC care went wrong. From the interviews it was clear that there was hostility towards ISTCs from both the NHS and the local press. It must be noted, again, there was very little hostility to the NHS TCs. Because of the hostility between ISTCs and the NHS, communication between ISTCs and clinicians working in the NHS was hampered. As a result the communication links are weak, which makes it difficult for ISTCs to establish themselves in the local healthcare system.

Ideally, such hostility would simply indicate healthy competition in the marketplace. However, competition does not negate the ability to collaborate and provide a continuum of care to the patient. The current environment clearly impinges on the flow of information between ISTCs and the NHS, as well as the integration of this information.

Policymakers should determine who should have this responsibility. If there is a role for the PCTs to play, this role should be one of a facilitator and honest broker

between the NHS providers and independent sector. It is not clear whether PCTs can play this unbiased role, as was evidenced in the Wave 1 contracts (Anderson 2007).

Alongside the encouragement of new market entrants, policymakers should consider the promotion of regulatory policies on a number of different levels to insure a level playing field for IS and NHS providers alike. Specifically, the overall regulation of the independent sector needs to be standardised with regulation of the public sector.

Policymakers should consider aligning the regulatory frameworks of the independent sector and the NHS. At present, care for NHS patients which is provided by the independent sector is regulated by different legislation than is care provided by the NHS (Healthcare Commission 2007). This means that different standards are applied depending on where a patient's care is delivered. These differences result in a number of gaps and inconsistencies with respect to national minimum standards, which regulators use to inspect the independent sector. The Department of Health should align regulatory requirements across the two sectors, as they provide services to the same patients (NHS patients).

Policy Proposal 5: Independent Sector Innovations Should Be Encouraged and Important Lessons Should Be Drawn for How NHS Providers Implement these Innovations such as in the Treatment Centres.

There are a number of important lessons for how Independent Sector and NHS providers implement innovations such as in the treatment centres. One of the most compelling outcomes of the research is the fact that the NHS TCs were often used as an extended ward for the NHS Trust Hospital rather than a true treatment centre. One of the stated goals of the TC Programme was to bring innovation for new standards of care. Though there were some isolated cases of innovation and implementing new models of care, more often than not, the NHS TC had merely transferred the old ways of working in a Trust Hospital. The evidence suggests that past policies and practices tended to dilute the full implementation of innovations.

While none of the ISTCs had problems with consultant notes, this was a common issue that interrupted the operational flow of the NHS TCs. The NHS consultants, whether in the NHS Trust Hospital or NHS TC, stated that their unwillingness to operate without 'notes' was due to patient safety concerns and the potential for liability in the event of a medical error. Due to the NHS consultants' unwillingness to

operate without consultant notes and the diagnostics being an important component of notes, any breakdown in the coordination of the notes could lead to cancellations or even medical errors. The NHS still uses handwritten and paper documentation which is more easily lost or misplaced. The 'notes' were not an issue within the ISTCs visited. Patient information was typically put into the information management systems that the ISTCs had in place. As a result of the fact that the information was in electronic format, the pertinent patient information were readily accessible in nearly every part of the treatment centre.

Another example is the case of one ISTC having a profound influence on an NHS TC's scope of services. This respective ISTC and NHS TC are unique in the fact of their co-location and sharing of services. The ISTC's staffing consists only of the operating theatre staff and three administrators. All pre-admission, pre-operation and post-operation functions are carried out by the NHS. As the respective ISTC was contracted to do joint replacement procedures, and continued to do these while there were complaints from the Royal Colleges, this opened the door for the NHS TC to provide these types of procedures. It could be argued that the stand-alone NHS TC would never have ventured to provide these types of services without the adjacent ISTCs influence. However, as the NHS TC was already supporting the pre-operative and post-operative care for the joint replacement procedures for the ISTC, it was a relatively small step to begin these replacement procedures themselves within the NHS TC's operating theatre.

It must be stated that in the first instance upon learning about this unique co-location and sharing of services, the original view was that this would not be a pertinent case study for research purposes. However, due to their close physical as well as operational relationship, it became clear to the researcher that there was a profound influence of the Independent Sector upon the NHS and thus the ability to break through the barriers of the 'old way of doing things.'

Innovation however transcends to beyond just the practices of the NHS providers. Another example is setting patient and family expectations and the relationship of the PCTs in post-discharge patient care with the ISTCs. The ISTCs emphasised setting patient expectations, how closely coordinated post-discharge care is coordinated with the home environment and whether home environment support is ensured from the beginning. The qualitative research provides evidence of a number of examples of the PCTs working with the ISTCs in setting discharge dates prior to admission for home

support, whereas with the NHS TCs, the PCTs were unwilling to do this until after the patient was admitted. The integration of the PCT into the ISTC care process appears to have resulted in not only better operational flow – since the ISTC has the ability to provide the full contract of care – but also improved quality of care, since patients receive post-discharge care immediately.

NHS TC's, like the Trust Hospitals tended to educate patients following surgery and prior to discharge. There were cases where family members went on vacation and, as a result, patients were not discharged in the expected time frame. The history of these types of examples have led the PCTs unwilling to schedule post-operative care with the NHS providers unlike after discharge since the actual discharge date was deemed to be unreliable until the event had taken place.

Though the integration between ISTC and PCT for discharge care seems to be much better than between the NHS TCs and PCTs, still there needs to be improved integration between the ISTCs, PCTs and NHS facilities if further attention is needed (beyond physiotherapy) within one of the TCs or hospitals. What do ISTC patients do when things go wrong? If patients experience problems after they have been discharged, their course of action is not straightforward as day units at ISTCs are not staffed out of hours, and mobile units may have moved elsewhere. There should be systems in place for patients to be transferred to NHS facilities. As a result, the better integration of the ISTC after patient discharge with the local provider network is essential.

Policy Proposal 6: The ISTC Programme Should Be Continued or Expanded Because of Its Ability To Change the Existing NHS Organisational Culture.

Policymakers should continue to use the ISTC Programme as an agent of change for the NHS organisational culture. The ISTC programme is not merely about privatising health, but also challenging the NHS status quo and organisational culture.

If physical capacity was the only issue that mattered, it is likely the government would have continued to merely increase funding for NHS Trust Hospitals or even further contract with the incumbent private hospital market (BMI, BUPA, Nuffield, etc.) to deliver the care needed. However, as a strategy, the Department of Health's treatment centre program has encouraged new market entrants and these entrants are an integral part of the NHS decentralisation process.

Whether or not it was intended to do so, the decentralization of health care provisioning seems to be breaking up the traditional command and control health care economy and, with it, the NHS organisational culture. Further, the policy of additionality seems to be an accidental policy driver of breaking up the traditional NHS consultant monopoly. Though the Treatment Centre Programme plays a relatively minor part in the overall NHS in terms of patient volume and spending (both <1%), its initial impact on the entire NHS seems to have been quite substantial. We are seeing new market entrants, the entrance of non-NHS consultants into the market and PCTs contracting with facilities outside of their local trust area.

In reality, the answers to this dissertation's research questions may be much more complex than merely who owns what facility. Rather, ownership should be viewed as part of a 'package' where decision-makers face differing incentives, and to the extent that they have the freedom to organise and develop processes in response to those incentives, the organisational model adopted can differ dramatically as in the cases within this dissertation where public and private providers alike are intended to deliver the same services.

As a result of changes in the incentive structure, the research suggests that the differences in ownership type (public and private) has played a role in the observed differences in organisational and operational approaches of the IS and NHS Treatment Centres. Accordingly, policymakers should consider the continued implementation, and even expansion, of the TC programme, to ensure that continuous change is implemented within the organisational culture of the NHS.

7.3.2 Policy Implications: Those That Became Apparent from Conducting the Research.

There are a number of policy implications that became apparent from conducting the research. Performance monitoring should be changed from an input to an output and outcome based measure, national data should be improved and information shared so that public and private facilities can be more easily compared, incentives in the NHS should be better aligned, competition should continue to be promoted to incentivise providers, and the ISTC programme itself should be continued or expanded because of its ability to change the existing NHS organisational culture. These policy proposals will be further explained below.

Policy Proposal 7: Performance Monitoring Should Emphasise Outputs and Outcomes.

In the past, hospitals often complained that, because health was complicated, they did not know their costs. This excuse effectively devolved accountability from financial and operational management of public resources. However, the treatment centre programme has demonstrated that health can be quantifiable. There are certain products, such as elective surgeries, that are discrete, and where one can draw boundaries around the service with respect to cost and quality. The clearest example is with NHS TC GG, which had to cost out areas of the treatment centre in order to contract with the adjacent ISTC.

The treatment centre programme is an important component of a larger structural shift in the NHS' thinking. Health is no longer 'different,' and unquantifiable. The treatment centre programme illustrates that we can measure and quantify a product for the policy outcomes that a government seeks to achieve.

A significant aspect of this will be monitoring the quality and costs of care provided for public patients. There should be greater clarity and consistency over the roles and responsibilities for monitoring the quality of care. It is the responsibility of ISTCs to demonstrate to their sponsoring Primary Care Trusts (PCTs) and prospective patients that they are providing high-quality services. Yet it is also important that the NHS organisations have mechanisms in place to ensure consistent monitoring of clinical outcomes for both public and private organisations.

However, there are complex contractual and reporting requirements for ISTCs. There is significant confusion regarding the relative roles and responsibilities of the Department of Health and sponsoring PCTs (Healthcare Commission 2007). If nothing else, the treatment centre programme, specifically the ISTC programme, has highlighted the need for accountability and data reporting to ensure value for money is received in terms of cost and quality of a product the NHS is purchasing on behalf of the public. Data and information is increasingly recognised as important in order for the public authorities to monitor contracts and performance.

NHS contracting with private providers is viewed as an important step in ensuring value for money (Commercial Directorate 2005). The NHS focus on outputs, of which one important component is payment by results (PBR), or the HRG system, is an important component of the NHS' contracts with the independent sector. In the past,

the method of purchasing was primary budget based without an emphasis on performance. Gradually, all providers will be paid on the payment by results methodology which will emphasise output and performance.

As a result of contracting with the independent sector, there are much stronger control mechanisms now in place, not just for services provided by the independent sector, but also the NHS. For years NHS providers have been protected from scrutiny, as they were assumed to be motivated purely by the interests of the people they served and thus delivered public services at the optimal quantity and quality. However, in recent years NHS performance has been increasingly questioned. With the increasing emphasis on output based performance measurement, there has been significant pressure on the NHS to increase its performance. The desired effects are only now beginning to be seen.

Policy Proposal 8: National Data Needs To Be Improved.

Policymakers should consider improving the quality of national data and how such data is shared. The traditional Hospital Episode Statistics (HES) data is often out of date and only reported once a year. The Dr. Foster's data that is now available to providers is updated on a monthly basis. These data sets are important because they can be used to monitor and assess the care patients receive, to compare care provided in the independent sector with the NHS, and to track patients as they move between the NHS and the independent sector. Up until now, submissions to these systems have not been robust or enforced (Healthcare Commission 2007).

There is definitely room for improvement. The majority of the NHS Treatment Centres do not report directly to the national statistical database, making it very difficult to ascertain the operations of these facilities. The NHS Trust Hospitals have not been accountable for accurate and full reporting. An important aspect to this is the linkage between data reporting and financial remuneration. For the most part, such a linkage does not exist. However, under the Payment by Results (PbR) system, it is expected that data reporting and quality will improve.

It was clear from the Health Select Committee hearings that independent sector and NHS data reporting were not consistent and therefore not comparable (Health Committee 2006). As a result, there has been very little quantitative research comparing the performance between the independent sector and NHS. ISTCs are required to report their performance to a number of different organisations. It is

recommended that these requirements be streamlined. Further, the ISTC contracts were not all standardised early on. Though the Commercial Directorate has sought to standardise at least the reporting requirements, it is still not consistent with the reporting of the NHS facilities. With respect to the NHS providers, the independent sector cannot be expected to force the public sector to comply with consistent data reporting; rather, the responsibility for ensuring that data from public and private providers is comparable falls to the public authorities.

Policy Proposal 9: Incentives in the NHS Should Be Better Aligned.

Policymakers should reconsider the existing incentive structure of the NHS, which is beset by cross incentives, even disincentives. An appropriate alignment of the incentives in the system will allow for greater efficiency, improved quality, greater access to care (through reduced wait lists) and, in the end, 'value for money.'

For example, the tradition of paying NHS consultants a fixed salary but allowing them to work in the private sector while off-duty is beset by perverse incentives. There is no financial incentive to strive to deliver the maximum volume of care in the NHS. In fact, because an increase in the NHS' overall performance would negatively impact demand for private practice services, there is actually a financial disincentive to improve NHS care too dramatically.

NHS consultants have recently received a 25% increase in their wages between 2004 and 2007, while seeing their workload fall (National Audit Office 2007). Patricia Hewitt said it best when she stated "for all the extra money, all the extra staff and extra patients treated, NHS productivity remains almost unmoved (Hewitt 2007)."

In comparison, the ISTC consultants are paid on a salary basis with strict controls to achieve necessary throughput levels. Broadly speaking, ISTC consultants are not paid a higher salary. However, there are certain financial incentive mechanisms in place appropriately aligned to hit performance targets. NHS consultants do not have these financial incentives to hit targets. The NHS consultants were paid on a 40-hour week based upon clinic time and operating theatre utilisation, but not performance. Utilisation is not always aligned with performance.

Furthermore, the consultants working for the ISTCs were typically employees of the facility and could not work for other organisations. This employment structure allowed incentives to be more clearly aligned with the mission and vision of the organisation and the public patients for whom they provided care. The NHS could

learn much from the stream-lined incentive structures and exclusive consultant relationship found in the independent sector. The NHS should reassess its policies allowing employees to work for other organisations or have a private practice, or re-examine the way consultants are paid.

Policy Proposal 10: Competition Should Continue To Be Promoted, To Incentivise Providers.

Policymakers should continue to emphasise increasing competitive forces in the NHS marketplace. An important aim of the government's plans for the NHS has been to cut the time that patients wait for care. It has aimed to do this, in part, by encouraging the emergence of a wider range of healthcare providers, so as to increase capacity, encourage innovation and improvement in services, and provide patients with more choice. An important element of this policy was the creation of the treatment centres.

Wave 2 of the ISTC Programme, originally meant to provide contracts worth £700m a year, now seems likely to be more than halved. If the threat of competition is to remain real, however, there has to be a large enough NHS market to keep the private sector investing in it – and interested. Tony Blair's original goal was to give independent providers about £1.2bn worth of business a year – or £6bn over five years – through centrally negotiated contracts. But the first £500m wave of treatment centres proved to be more than a third smaller than planned, at a value of only about £280m a year, according to the health department. The second wave and diagnostics now look likely to amount to £200m to £300m a year, rather than the £700m planned. Therefore, the whole programme – in which the private sector has invested millions of pounds in bid costs over five years – may turn out to be less than half the amount originally promised (Timmins 2007).

The qualitative analysis does not show the effect of greater competition between the ISTCs and NHS TCs, however, because there is little, if any overlap in competitive market areas. That said, from the literature review, there is evidence from other sources that peer effects are imposing some competitive pressures on the NHS.

A key change in the provider reimbursement policy is the manner in which the contracts and providers (NHS and independent sector) are reimbursed. This change makes the linkage between money flows and the patient more explicit. In Wave 1, the ISTC providers receive a budget payment with a guaranteed floor payment. NHS TC

providers also receive a budget, albeit from the NHS Trust Hospital. The NHS Trust Hospitals, for the most part also receive a budget payment.

Choice is one of the core principals of the Government's approach to reforming the way health care is delivered by the NHS. While allowing patient choice is presumably better than not allowing them choice, the government is hoping that choice will also deliver some of the desirable effects of market competition (e.g. increased equity, quality, etc.). The policy of choice, however, only works if money follows the patient. A significant portion of the NHS hospitals were not yet reimbursed in this manner as the Payment by Results was to be only fully implemented as of April 2008 (Department of Health 2008). ISTCs are not either, as the current contracts are fixed volume contracts. As a result, the current reimbursement mechanisms in the system breaks the direct link between choice and money (which should follow the patient), the link which leads to the desired competitive effects.

Furthermore, a key aspect of choice is the referral process to the treatment centres, specifically the ISTCs. Virtually all of the ISTCs visited were not receiving the expected referrals and were thus operating at below capacity of utilisation, even carrying out less activity than they were originally contracted for. However, the most recent evidence does show that ISTC utilisation of capacity is increasing markedly.

Referrals typically come either from the General Practitioners (GPs) or the PCTs. GPs will only refer a patient to an ISTC if they are aware of its existence, know what it provides and have confidence in its provision of care. While these issues may explain some of the missing referrals, there appears to be a certain hostility from the GPs to the independent sector (CBI 2008).

From the PCT side, referral patterns vary from one PCT to another. This is caused largely by variations in the strength of support for the ISTC from PCTs themselves. A number of the contracts were forced upon local PCTs by the central government. As a result, there has been significant residual hostility – these PCTs feel the independent sector has been forced on them.

That said, ISTCs and PCTs are dealing with the lack of referrals in a variety of ways. Some have chosen to accept patients whose profile and condition puts them on the very edge of the ISTCs' remit (e.g. ASA 3 unstable, even ASA 4). This extends the number of patients who can be treated in the ISTCs, but it involves additional

risks and increases the likelihood of complications. In others, the solution has been to market the ISTCs to a wider geographical area.

Despite these issues, there is evidence that competition has been effective. There has been some evidence that private hospitals are lowering their spot purchase price for NHS patient services (Health Committee 2006). Though ISTCs have so far had only a limited effect in volume terms (2006; Health Committee 2006), they have had a major effect on the behaviour of providers (Timmins 2005). The mere arrival of an independent treatment centre in an NHS facility's marketplace has suddenly made conversations with NHS consultants about how services are organised and how waiting times can be cut much easier (Smith 2006). Simon Stevens, Tony Blair's former health adviser, put it bluntly, stating that if NHS consultants did not perform the operations, there would be *"a bunch of Germans coming round the corner who would* (Timmins 2005)."

The Wave 1 tenders introduced new market entrants to the U.K. The existing private operators (e.g. BUPA, BMI) from the initial Wave 1 tenders chose either not to participate, or if they did, their bids were not successful. As a result, the winners from Wave 1 were all new market entrants.

The new market entrants have impacted health delivery in England via three ways[3]. First, as we have seen, there is some initial evidence that the new market entrants are having an impact on the NHS Trust Hospitals. Second, there has been an effect on the traditional private providers who contract with the NHS via spot purchase prices, which have come down. Third, since Wave 1, the traditional private operator market has undergone significant changes. BMI was acquired by Netcare, a new market entrant, with support from a private equity group. BUPA set up a subsidiary to bid on Wave 2 contracts. This subsidiary is to have an emphasis on providing services to NHS patients. More recently, BUPA Hospitals has been acquired by another private equity group. Private equity and other private operators have seen that the traditional private operators have not maximised the value of their organisations and have therefore been acquired to increase shareholder value.

Another important aspect of the Wave 1 tenders was the ability of the new market entrants to enter the NHS market through the structure of the contracts. The five year

[3] The BUPA Redwoods case has been used as a case study example for the Wave 1 tenders (Health Committee, 2006), but this is an anomaly for two reasons. First, the BUPA contract was given prior to the Wave 1 tender. Further BUPA uses NHS consultants.

guaranteed revenue contracts at a higher than tariff price (though lower than the spot purchase price) encouraged new market entrants, by removing the upfront capital costs of development treatment centres, a significant barrier to market entry.

A less obvious barrier to market entry concerns traditional GP referral patterns and patient habits. Consultants and patients are used to being referred to their local hospital, and this habit may be slow to change (Le Grand 2007). This aspect became clear in the initial period of the Wave 1 contracts. The ISTC providers were operating at very low volumes due to the lack of referrals from the local GPs and PCTs (Health Committee 2006). It appears that referral volumes are now increasing and that Wave 2 will be able to remove the guaranteed revenue stream from the contracts.

The Government feels that the ISTC programme is driving a dramatic shift in private provision (Commercial Directorate 2004). Prior to the ISTC programme, the Private Medical Provider market in England could have been characterised as a somewhat niche high-cost, low-throughput business with the Private Medical Insurers the primary customers. As a result, the NHS was typically paying in excess of 40% over its current HRG tariff prices to augment local capacity, commonly referred to as the spot purchase price. There is now have a 'mid-tier market' beginning to arise with the independent sector providers on a high-throughput, low-cost business model with the NHS the primary customer. There is also evidence that the incumbent providers are re-evaluating their business strategy to be far more competitive (Commercial Directorate 2004). Even UNISON concedes that if the ISTCs have accomplished anything, they have driven down the cost of private hospital services to the NHS (UNISON 2005).

7.4 Key Limitations of Research and Suggestions for Further Research

There are a number of potential limitations to the quantitative and qualitative evidence. These will be reviewed in the following sub-sections.

7.4.1 Quantitative Work

There are several key limitations to the approach used and the quality of the data used. These limitations include sample size, comprehensiveness of the data, data robustness, time-frame of the cases researched as well as the independent variables themselves.

A main issue of concern is the sample size in the regression models, as small data samples may mean that findings are not always statistically robust. A minimum acceptable sample size is important in testing the overall fit of the regression model as well as in testing the individual predictors within the model.

The HRGs analysed were hip and knee replacement surgeries, hernias and cataracts. Though these account for the largest proportion of elective cases, they only account for a small proportion of the varying HRG procedure areas. Arguably, the researcher could have included all HRG discharges within a facility. However, the individual HRG sample sizes would have been significantly smaller and there would have been fewer facilities for cross case comparison purposes.

Another limitation is that hernias and cataracts are conducted primarily on an outpatient basis, but the data is reported in days, not minutes or hours. Consequently, the smallest unit of analysis is one day. The researcher attempted to overcome this issue by using the total per centage of patients that were discharged within one day. The theory is that if a treatment centre is selecting appropriate patients, then nearly all, if not all, patients should be discharged on the same day, when adjusting for case mix. However, poor data means a complete picture of performance is not available. It also means that there are gaps and inconsistencies between providers and with respect to the NHS and the reporting of data.

An additional issue of major concern is the selection of the case studies. Selecting cases that are fully operational may create a self-selecting bias in itself. These are valid arguments. However, the researcher assumes that the number, in relative terms, of ISTCs fully operational should be equal to the NHS TCs fully operational. Therefore, even if there is selection bias this would not affect the regressions by ownership, only those by facility type. Furthermore, the facilities chosen were facilities deemed operational as of January 2006. The facilities that were operational may, in fact, always have better indicators than the facilities not yet open due to their operational know-how. This selection bias would then be in effect for both the ISTCs and NHS TCs. As the NHS TC program was launched a few years before the ISTC program, there may have been a smoothing effect already in place between the respective facilities. Undoubtedly, over time the issue of selection bias will lessen.

There are significant outliers, or extreme values in the data which can exert an excessive influence on the results of the regression. Within the NHS, as well as the NHS TCs, there were more outliers than in the ISTCs and Private Sector Hospitals.

In this research we assess efficiency with average length of stay (ALOS) in hours/days (measured from time of admission to the time of discharge) but there are obvious limitations to the use of ALOS as a proxy for performance. Other potential efficiency components, such as operating room (OR) time, OR's used-per-day versus number of OR's in total, and surgeries per doctor per shift, may be better measures of efficiency. However, this data is not reported to a central NHS database. Individual attempts were made to estimate staff performance via calculating staffing numbers alongside volume figures. However, this was not possible due to the diverse nature of surgeries and limitations on case mix adjustment, as well as limitations on attaining staffing data at the ISTCs and NHS facilities. As result, ALOS has been determined to be the best indicator to broadly assess differences in performance, while keeping in mind the limitations detailed in Chapter 4. However, ALOS is very highly positively skewed and there are significant outliers, or extreme values, in the dependent variable that can exert an excessive influence on the results. Some may argue that using median and inter-quartile range data may be better statistical measures to use. Median and inter-quartile range were cross-checked with the evidence.

With respect to the quality outcomes data assessed, there is some evidence in the literature of that suggests for potential linkages between a lower ALOS and a resultant increased chance for readmission. Though researcher was cognizant of this, the research did not track individual patients that were readmitted and adjust for this potential limitation.

In this respect, there was anecdotal evidence provided to the Parliamentary Health Select Committee Hearings in the summer of 2006 which alluded to the fact that the NHS Trust Hospitals were seeing a number of readmissions from initial surgeries at ISTCs. It is important to note that none of evidence was substantiated, which the Committee themselves commented upon in their final report (Health Committee 2006). Since the Health Select Committee reports, a study was published by orthopaedic surgeons in Cardiff found that patients of hip operations on patients sent from their NHS trust to Weston-super-Mare NHS Treatment Centre between 2004 and 2006 were more likely to be readmitted to an NHS Trust Hospital for repair work (Lister, 2009). However, the study has come under quite some scrutiny as the publishers of this study had a financial interest in these poor outcome results due to loss of revenues from patient referrals. Therefore, to date, there has not been a

credible study with evidence that shows any linkages between ALOS and readmission rates within IS and NH TCs.

Another potential limitation to the findings is that the difference in means analysis between individual HRG comparisons does not account for the number of cases within each provider. For example, in a comparison between a private hospital with a low number of cases with a lower than expected ALOS and a NHS Trust Hospital with a high number of cases, the outcomes may be biased.

Another problem is ISTC and NHS central data systems are not currently able to provide robust data. For example, ISTCs are not consistently reporting to the NHS central database while NHS TCs are not reporting to the database at all, some ISTCs have not reported data accurately for some KPIs, and NHS-Trusts are having problems separating their treatment centre data from the Main Hospital data (Health Committee 2006; Healthcare Commission 2007; Mason, Miraldo et al. 2007; Pollock and Godden 2008).

This last point is of great interest and significantly underestimated so far in the general research. Currently, there are over 60 NHS TCs, but in any given case a maximum of 7 NHS TCs are shown to be reporting. The majority of NHS Trust Hospitals do not separate out the Trust Hospital discharges vis-à-vis the NHS TC data. Because the NHS TC data is embedded in the overall Trust data, the evidence suggests that by separating out the current reported data, NHS Trust Hospital performance could be even lower than suggested.

Another important limitation is that the HRGs have not been linked (until recently) to financial remuneration for the majority of providers assessed. Therefore, there is little financial incentive to report data accurately. This is an issue even within the ISTCs, as they are paid a guaranteed volume payment. In reality, reporting the data accurately is a cost, as it takes more time but offers no financial remuneration. If discharges were linked to remuneration, we wouldn't have missing provider codes for one-third of the patient records.

The nascence of the programme may not fully capture prospective performance of these new treatment centres. All these facilities are in start-up businesses, which typically take years to build up volume and performance. A related issue is that these facilities are not receiving the expected referrals, with many operating at below 50% occupancy.

Another weakness of the HRG methodology, at its current level, is that the groupings are not refined enough to account for variations in complexity in the individual patients and the total case mix of the respective facilities.

Further, there are certain limitations to the case mix adjustment with only two types of variables being used for assessing provider case mix. This is particularly important as despite a recent study using nine (9) case mix adjustment variables, the authors had reservations on whether their research had adequately adjusted their results for case mix due to their risk adjustment models having a poor predictive power (Brown, Jamieson et al. 2008).

Further, the quantitative analysis does not assess potential cost differentials between the various NHS and IS facilities. Cost data is not possible to attain as these are not reported to Dr. Fosters. There are commercial confidentiality reasons for not sharing this information to the public by the independent sector. However, certain data figures should be reported so that the NHS purchaser can estimate the true costs of an HRG. At minimum, as reference costs become linked to HRG payment, cost data of the HRG will become more in line with the true costs of services to, at minimum, allow for taking a view of the cost to the public purchaser for provision of care.

Evidence of misclassification of cases could have introduced a major distortion into the reported differences. Further, only seven (7) of the 60 NHS TCs are reporting to Dr Fosters. As a result, NHS TC data for the other 53 cases is incorporated statistically into the Trust Hospital data which may significant affect the findings, whereby improving the data reported by the NHS Trust Hospitals.

7.4.2 Qualitative Work

Selection bias is also a potential limitation in the qualitative data used. While selection bias in statistical studies typically understates the strength of the relationship between the independent and dependent variables, in case studies, selection bias may overstate the relationship (George and Bennett 2005). This would mean that the selection of ISTCs is not adequately uncorrelated with performance, but rather that only well performing ISTCs have been able to open so far. Thus selection bias may overstate the relationships found; in this case higher performance would be found across ISTCs than types of facilities that have been in use for a longer period of time.

The researcher gained access to the NHS TCs and NHS Trust Hospitals visited because they had asked to have their performance appraised. As a result, the NHS TCs chosen to be interviewed are likely to have been selected because of a recognised underperformance in their operational approach. In this case, it would appear that these facilities are performing more poorly. Moreover, it is possible these facilities were willing to be more open about the clinical operations in order to obtain the appropriate feedback. In the case study qualitative work, for the most part, evidence suggested that NHS TCs were not operating as intended. However, bias is minimised by the fact that the sites chosen were fairly representative of all NHS TCs (Douthwaite 2007). There were differences from facility to facility on the types of clinical specialty areas covered. Broadly, however, the case studies were representative in their use of technology, organisational structure, skill mix in staff, management practices, method of financial remuneration as well as having wait list problems and financial pressures as other NHS TCs not included in the case study research. Furthermore, the findings were found to be consistent with the work of the NHS Elect (Parker 2008).

This leads to potential limitations on the findings with respect to how ALOS in NHS TCs may be affected by the fact that the NHS TCs were in many cases being used by the NHS Trusts inappropriately to treat a range of cases outside the scope of the TCs. Certainly, the use of the operating theatres for inappropriate patients will affect throughput and recovery and inpatient beds being used by patients that are deemed inappropriate could certainly have knock-on affects on the ALOS of the TC providers.

Another potential issue is that the facilities chosen were facilities that were both operational and reporting to the NHS during the period January 1, 2007 to December 31, 2007, and these facilities may therefore be better performers than the facilities opened later, as indicated by their ability to open quickly. This issue was discussed further in the limits to quantitative analysis section.

It must be noted that all the private operators were new market entrants which may act as confounders to the evidence. Therefore it is important to disentangle the differences of the various new market entrants in their strategies and motivations for entering the UK ISTC market, which may have driven management decision-making and working patterns, thereby impacting the evidence observed.

The enquiry also found that the NHS was undergoing immense pressure at the time of study. The on-going changes, which may be the greatest since the inception of the NHS, undoubtedly have had some effect on the findings. Further, a number of the NHS Run TC interviews took place during the end of the fiscal year, as the Trusts were attempting to meet wait list targets, so as not to be in breach. As a result, there is a cyclical aspect to the operations of NHS facilities.

Observer error is another possible source of unreliability. For example, the interviewer does not have a medical background. As a result, the discussions with anaesthetists and consultants may not have been as detailed as they would have been for someone with formal medical training. This was mitigated by the fact that a number of the site visits were conducted with an independent consultant for NHS Elect, an operations expert in the field, and a nurse. As a result, the medical background of the co-interviewer allowed the research to pay attention to greater medical detail than if the researcher had conducted all the interviews alone. Additionally, outstanding questions were cross-checked with other medical personnel.

There is also the possibility of observer bias. Within the NHS there were many sensitive issues at play, as it was undergoing radical transformation. Many of these issues had been discussed openly in the media. However, in the ISTCs there was less conflictual information garnered. For instance, from the interviews, a number of the NHS consultants mentioned that at the ISTCs, the provisioning was not always as good as one would expect. This could not be verified. The interviewer certainly spent less time with consultant staff in ISTCs than with the NHS. This could be due to the fact that the ISTCs were more sensitive about information and the potential for negative information being published.

There may also be some endogeneity with respect to the use of consultants. The ISTCs were not allowed to hire consultants that had worked for the NHS within the past twelve months. As a result, most, if not all, of the ISTC consultants were from overseas. On the other hand, the NHS TCs used NHS consultants. As a result, some of the findings may be specific to the types of consultants that are on staff.

Finally, there is also the potential that while the NHS may underperform on some criteria, its overall social utility is compensated for by its outstanding performance on other criteria. The researcher was focused on internal efficiency, a criterion by which the independent sector is performing very well. However, the NHS has a larger role to

play in society. The researcher may have missed some of the bigger issues that the NHS struggles with that intervene in day-to-day operations.

7.4.3 Further Research

There will be obviously longer-term impacts of the Wave 1 ISTC programme, and accordingly, it is suggested that further research be conducted on this topic. The evidence will become clearer as the treatment centres increase in volume and the local environment becomes more accustomed to working with the independent sector.

There will be some very interesting research to be undertaken with respect to the implementation of the second wave of ISTC contracts (often referred to as Wave 2). The Wave 2 contracts will be different from Wave 1 in two important respects. These contracts will remove the provision of additionality. Second, the independent sector will be paid based on its performance - minimum payment will not be guaranteed. It is recommended that research be conducted on these two important aspects of the second contract wave.

The above weaknesses may limit the comparability between ISTCs and NHS TCs. Further research would be welcomed in this area on a number of fronts: the actual medical provisioning and quality outcomes; the various incentives or disincentives that drive the NHS and its consultants; and a survey of patients who have received care within the independent sector and how their attitudes have changed.

It is recommended that more detailed quantitative statistical evidence be conducted in the areas of efficiency, quality and equity. The statistical evidence undertaken has been at a relatively broad level and much more detailed analyses can be conducted.

It is recommended that research also be conducted on the allocative efficiency of the treatment centre expenditure. Opponents of the Treatment Centre Programme have argued that, even though there may be evidence of an increase in internal, or technical, efficiency, the fragmentation of health service leads to allocative inefficiency through the duplication of services, and thus a loss in economies of scope. The current theoretical construct amongst opponents of the treatment centre programme (e.g. ISTCs) is that fragmentation of health care necessitates poor allocative efficiency, as additional capacity leads to higher costs to the system as a whole. They further argue that fragmentation of health care services actually lowers

quality. As a result, the net effects to the entire health system are not so clear. It is proposed that research be conducted to shed light on whether this is actually true.

Additional research should also be conducted on quality outcomes, because the analyses that can be drawn from NHS patient records cannot illustrate the full extent of quality outcomes. The initial findings of the Key Performance Indicators (KPIs), which are reported by the ISTCs to the Central Contract Management Units (CCMU) on a monthly basis, were quite positive. The evidence suggests that there is a robust quality assurance system in place, more ambitious and demanding than that for NHS organisations. The KPI data to be collected and provided by the ISTCs extends beyond that used by the NHS and early results of quality monitoring are encouraging (National Center for Health Outcomes Development 2005). However, the NHS does not report KPIs. As a result, additional research in this area would be welcomed.

7.5 Next Steps: Where Do We Go from Here?

This dissertation attempts to broaden the policy debate on the Treatment Centre Programme. It does so by looking at England as a case study. Questions of efficiency, quality, and ownership have been examined in the context of the Treatment Centre Programme and the core objectives of the NHS. Evidence from England allows for a broader discussion of the global role of Treatment Centres, as well as the independent sector, in the delivery of care for public patients. However, one must be careful in assessing the answers to the research questions in this dissertation, as the true answers may be much more complex than evidence suggests. Regulation and competition, in addition to ownership, play an important role in the dynamics of the health system and the creation of appropriate incentive structures.

The above weaknesses limit the comparability purely from a quantitative and qualitative standpoint between the ISTCs and NHS TCs. As a result, some may argue that differences in performance may not, in fact, be related to ownership, but perhaps in the fact that the NHS has a significant number of additional responsibilities and pressures that ISTCs do not have.

The NHS has responsibility over the public health system in general and therefore it can be argued that there is an inherent bias in the research. However, the basic premise is that if the ISTCs and NHS TCs are intended to operate in the same manner, use the same business model to select and admit the same types of patients, and use the same technology, why then do they not operate in the same manner? The evidence

suggests that the difference lies in the ownership of these facilities, specifically that the NHS has been unable to manage its treatment centres as they were intended to operate, compared to ISTCs.

Questions surrounding the use of Treatment Centres within a health system are only beginning to be asked in a number of countries where these types of facilities are prevalent (US, Australia, etc). Of course, each health system is different, with varying policy goals and objectives, but all share common challenges: managing increasing demand, containing rising costs, and, ideally, improving access and quality.

Nevertheless, treatment centres will undoubtedly increase in numbers over the coming years, and difficult policy decisions will have to be confronted with regard to the role of these facilities in a country's health system. Further, there is a global trend for an increased role for the private sector in delivering care to public patients, a field traditionally run by the public sector.

As governments increasingly struggle to control rising health care costs while attempting to increase access and improve quality, policy-makers have sought out the private sector for solutions. The Treatment Centre Programme in England provides an excellent illustration not only of how the private sector can provide superior health services, but also how its introduction into a wider health system can lead to benefits even outside its immediate purview.

APPENDICES

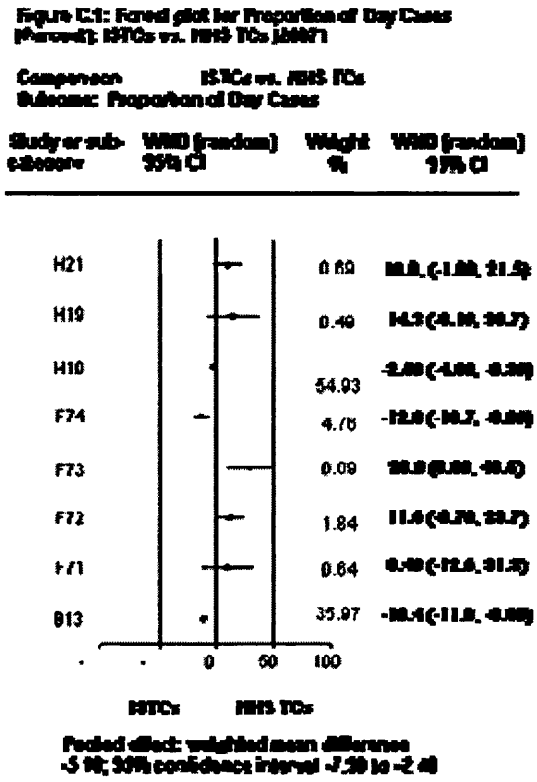
Appendix A: Age Bands

Id	Age
1	0
2	1–4
3	5-9
4	10-14
5	15-19
6	20-24
7	25-29
8	30-34
9	35-39
10	40-44
11	45-49
12	50-54
13	55-59
14	60-64
15	65-69
16	70-74
17	75-79
18	80-84
19	85-89
20	90+
99	Unknown

Appendix B: Interview Questions – Treatment Centres and Hospitals

1. Technology
1.1 Are there differing types of technologies used for the procedures (min invasive)?
1.2 Are there differing types of diagnostic (imaging and lab) technologies used that allows for quicker results/analysis?
2. Differing Organizational Methods
2.1 What is the management structure of the department/centre?
2.2 Who do the physicians report to?
2.3 What is the perception of management control over the physicians?
2.4 What is the ability of administrators to manage/incentivate the physicians
2.5 How are the anaesthetists organised? Are they employees of the centre/department? Or are they independent?
3. Different Skill Mix in Staff
3.1 What are the physician ratios versus nurses?
3.2 What type of nurses are on staff?
3.3 What is the nurse staffing ratio vis-à-vis beds/patients/OR's?
3.4 What is the role of trainee physicians?
3.5 Are they using different types of consultant staff
3.6 What is the OR staff mix/make-up?
3.7 What is the average years experience of a physician in the OR
4. Management Practices
4.1 How are the operating rooms run and time scheduled?
4.2 Is there block scheduling of physician time?
4.3 Are there parallel theatres always running?
4.4 How are patients selected?
4.5 What are the specific admission practices
4.6 What are the specific discharge practices?
4.7 What is the role of porters getting patients to the operating room?
5. Financial Incentive Structures
5.1 Are there specific physician incentive structure put into place?
5.2 How are these structured? Is it a Per centage of fixed fee? Is there a cap? Is it based on volume? Quality?
5.3 Have these incentive structures (variable component) been paid?
5.4 Are there incentive structures in place for other staff (non-physician)?
5.5 What is the general perception of these financial incentive structures put into place?

Appendix C: Proportion Day Cases (Per cent)



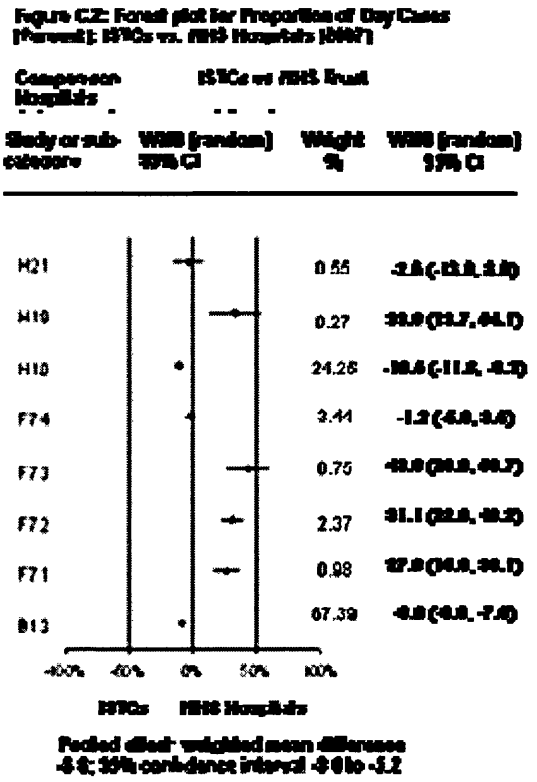


Figure C.3: Forest plot for Proportion of Day Cases (Percent): ISTCs vs. IS Providers (2007)

Comparison: ISTCs vs. IS Providers
Outcome: Proportion of Day Cases

Study or sub-category	WMD (random) 95% CI	Weight %	WMD (random) 95% CI
H21		0.66	11.3 (-1.00, 23.7)
H19		0.32	76.7 (54.0, 99.3)
H10		60.50	-22.0 (-24.0, -19.9))
F74		3.58	47.9 (35.2, 60.6)
F73		0.34	64.0 (30.8, 97.2)
F72		1.07	49.7 (28.5, 70.9)
F71		0.25	34.8 (-3.40, 73.0)
B13		33.28	47.0 (44.3, 49.6)

-100% -50% 0% 50% 100%

ISTCs IS Providers

Pooled effect: weighted mean difference
5.20; 95% confidence interval 2.00 to 8.40

Figure C.4: Forest plot for Proportion of Day Cases (Percent): IS Providers vs. NHS TCs (2007)

Comparison: IS Providers vs. NHS TCs
Outcome: Proportion of Day Cases

Study or sub-category	WMD (random) 95% CI	Weight %	WMD (random) 95% CI
H21		1.02	0.00 (0.00, 0.00)
H19		0.66	-36.8 (-88.0, -62.4)
H10		61.84	21.6 (17.2, 19.4)
F74		3.72	-49.5 (-72.0, -60.7)
F73		0.77	1.90 (-71.8, -35.0)
F72		1.87	-16.3 (-60.2, -38.2)
F71		0.81	7.90 (-58.7, -25.4)
B13		29.31	-55.0 (-59.8, -57.4)

-100% -50% 0% 50% 100%

IS Providers NHS TCs

Pooled effect: weighted mean difference
-5.00 95% confidence interval -12.3 to -8.70

Figure C.5: Forest plot for Proportion of Day Cases (Percent): IS Providers vs. NHS Hospitals (2007)

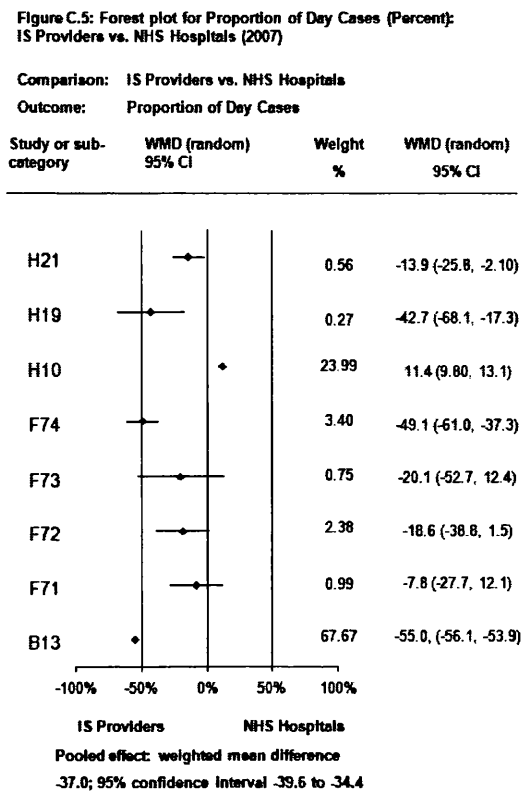
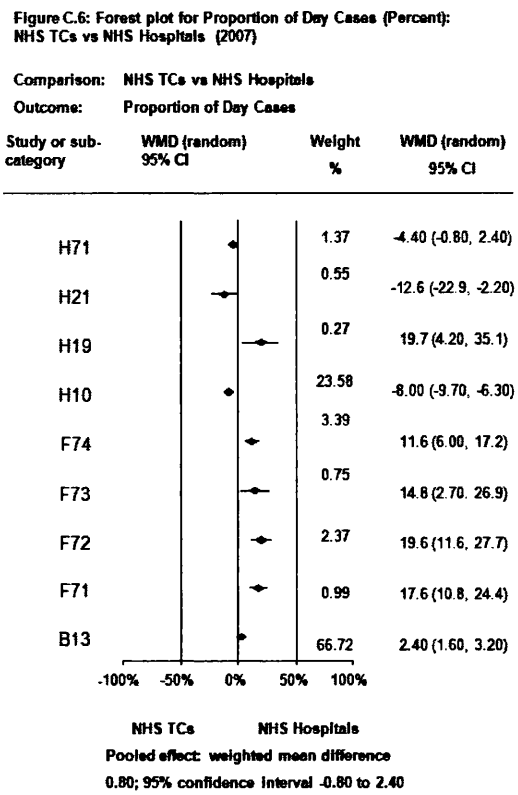


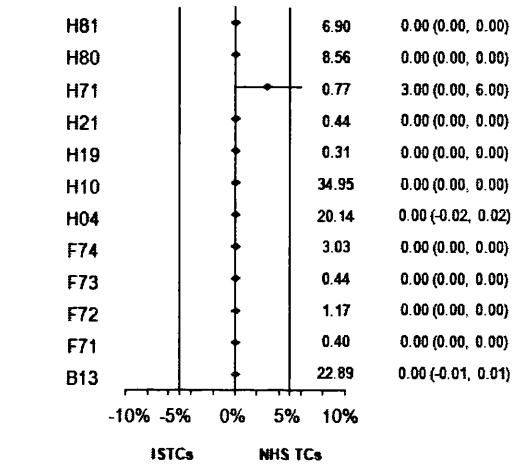
Figure C.6: Forest plot for Proportion of Day Cases (Percent): NHS TCs vs NHS Hospitals (2007)



Appendix D: Death within 30 Days after Discharge (Per cent)

Figure D.1: Forest plot for Death30 (Percent): ISTCs vs. NHS TCs (2007)

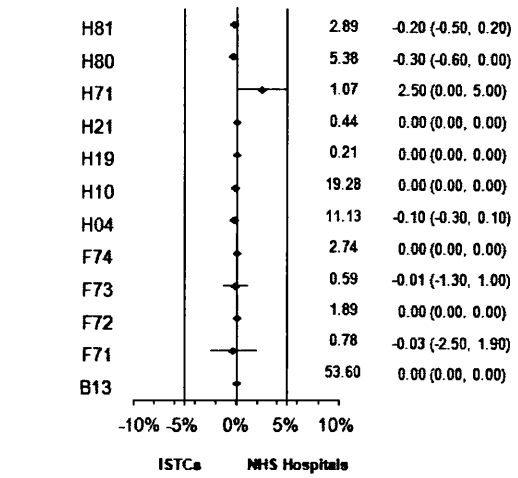
Comparison: ISTCs vs. NHS TCs
Outcome: Death30



Pooled effect: weighted mean difference
0.00; 95% confidence interval 0.00 to 0.01

Figure D.2: Forest plot for Death30 (Percent): ISTCs vs. NHS Hospitals (2007)

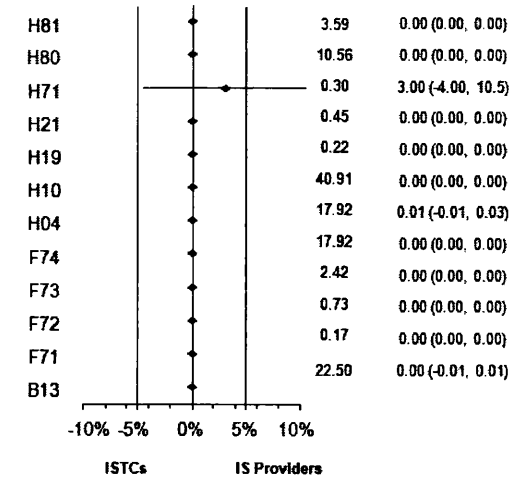
Comparison: ISTCs vs NHS Trust Hospitals
Outcome: Death30



Pooled effect: weighted mean difference
0.00; 95% confidence interval -0.01 to 0.01

Figure D.3: Forest plot for Death30 (Percent): ISTCs vs. IS Providers (2007)

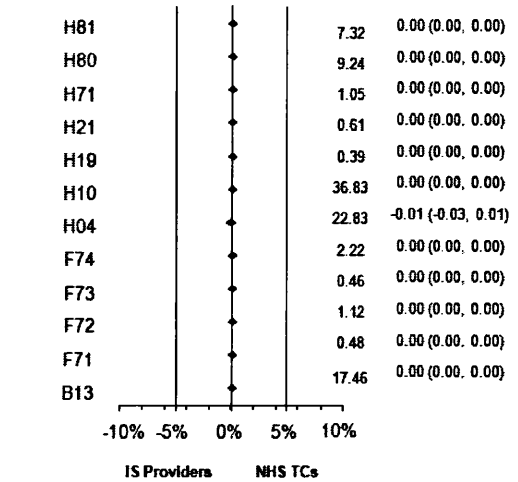
Comparison: ISTCs vs. IS Providers
Outcome: Death30



Pooled effect: weighted mean difference
0.00; 95% confidence interval 0.00 to 0.01

Figure D.4: Forest plot for Death30 (Percent): IS Providers vs. NHS TCs (2007)

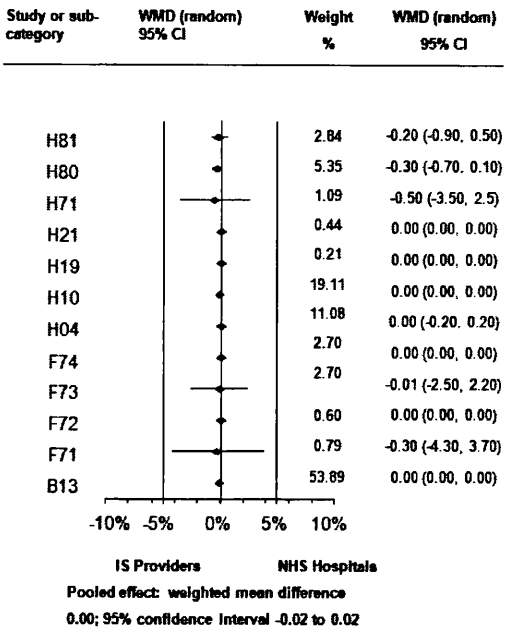
Comparison: IS Providers vs. NHS TCs
Outcome: Death30



Pooled effect: weighted mean difference
0.00; 95% confidence interval -0.01 to 0.00

Figure D.5: Forest plot for Death30 (Percent):
IS Providers vs. NHS Hospitals (2007)

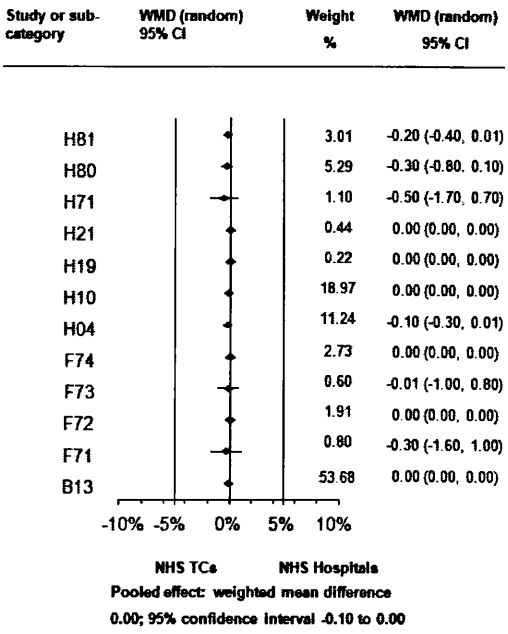
Comparison: IS Providers vs. NHS Hospitals
Outcome: Death30



Pooled effect: weighted mean difference
0.00; 95% confidence interval -0.02 to 0.02

Figure D.6: Forest plot for Death30 (Percent):
NHS TCs vs NHS Hospitals (2007)

Comparison: NHS TCs vs NHS Hospitals
Outcome: Death30

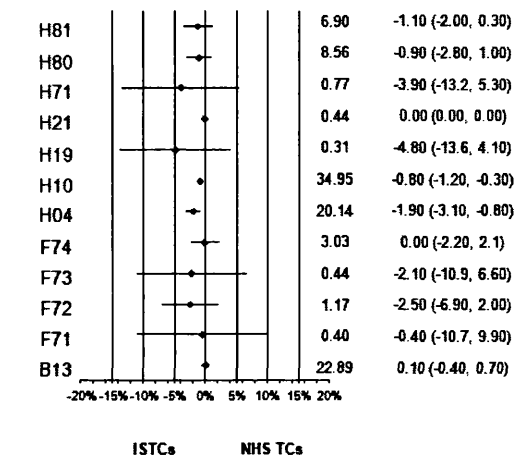


Pooled effect: weighted mean difference
0.00; 95% confidence interval -0.10 to 0.00

Appendix E: Readmission (Per cent)

Figure E.1: Forest plot for Readmission (Percent): ISTCs vs. NHS TCs (2007)

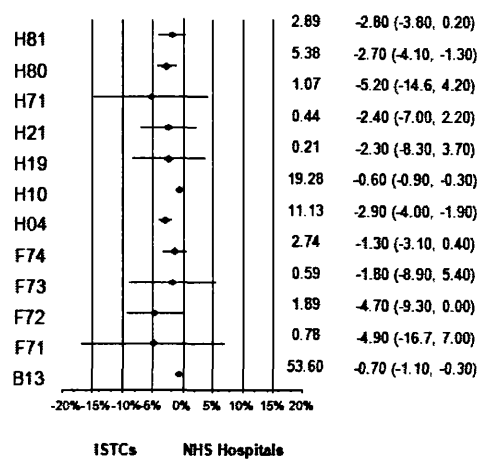
Comparison: ISTCs vs. NHS TCs
Outcome: Readmission



Pooled effect: weighted mean difference
-0.90; 95% confidence interval -2.00 to 0.30

Figure E.2: Forest plot for Readmission (Percent): ISTCs vs. NHS Hospitals (2007)

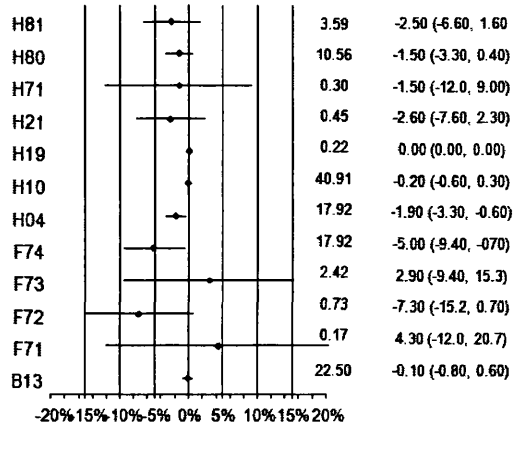
Comparison: ISTCs vs NHS Trust Hospitals
Outcome: Readmission



Pooled effect: weighted mean difference
-1.30; 95% confidence interval -2.20 to -0.30

Figure E.3: Forest plot for Readmission (Percent): ISTCs vs. IS Providers (2007)

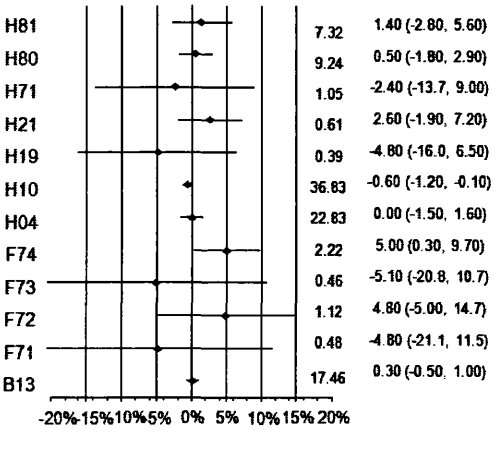
Comparison: ISTCs vs. IS Providers
Outcome: Readmission



Pooled effect: weighted mean difference
-1.60; 95% confidence interval -3.70 to 0.50

Figure E.4: Forest plot for Readmission (Percent): IS Providers vs. NHS TCs (2007)

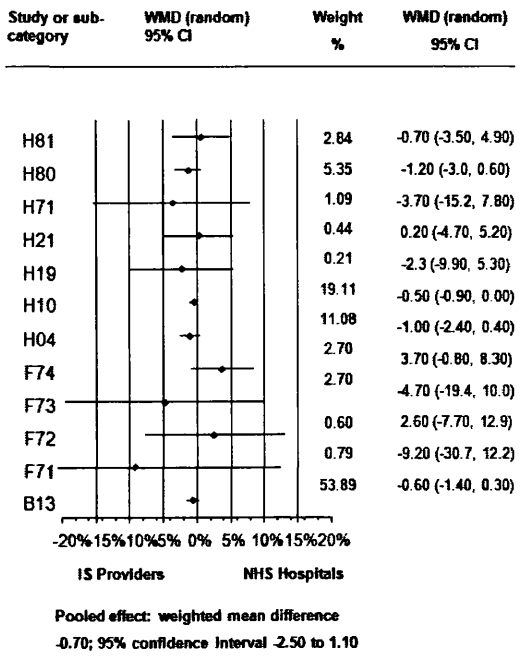
Comparison: IS Providers vs. NHS TCs
Outcome: Readmission



Pooled effect: weighted mean difference
0.10 95% confidence interval -1.70 to 1.80

Figure E.5: Forest plot for Readmission (Percent): IS Providers vs. NHS Hospitals (2007)

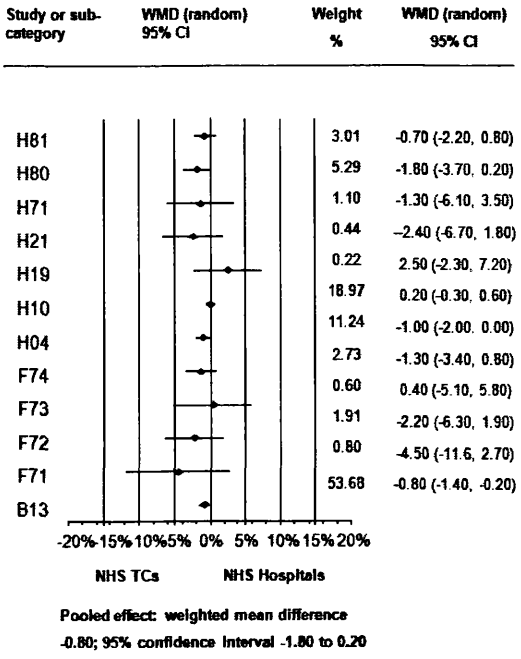
Comparison: IS Providers vs. NHS Hospitals
Outcome: Readmission



Pooled effect: weighted mean difference
-0.70; 95% confidence interval -2.50 to 1.10

Figure E.6: Forest plot for Readmission (Percent): NHS TCs vs NHS Hospitals (2007)

Comparison: NHS TCs vs NHS Hospitals
Outcome: Readmission



Pooled effect: weighted mean difference
-0.80; 95% confidence interval -1.80 to 0.20

Appendix F: Patient Age (Years)

Figure F.1: Forest plot for Patient Age (Years): ISTCs vs. NHS TCs (2007)

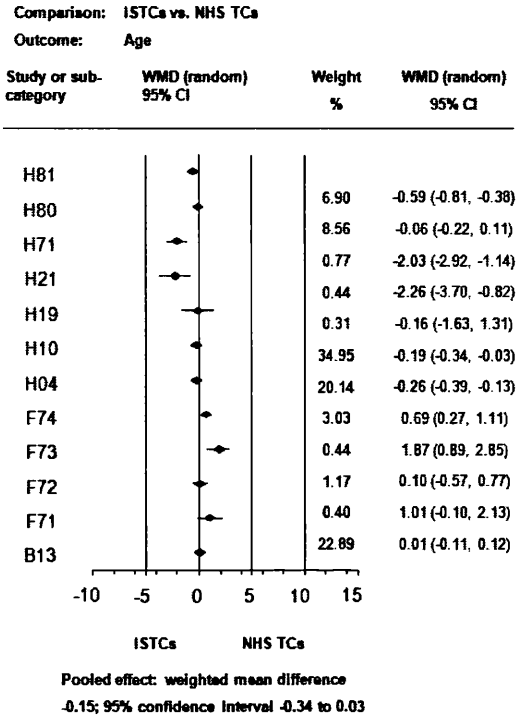


Figure F.2: Forest plot for Patient Age (Years): ISTCs vs. NHS Hospitals (2007)

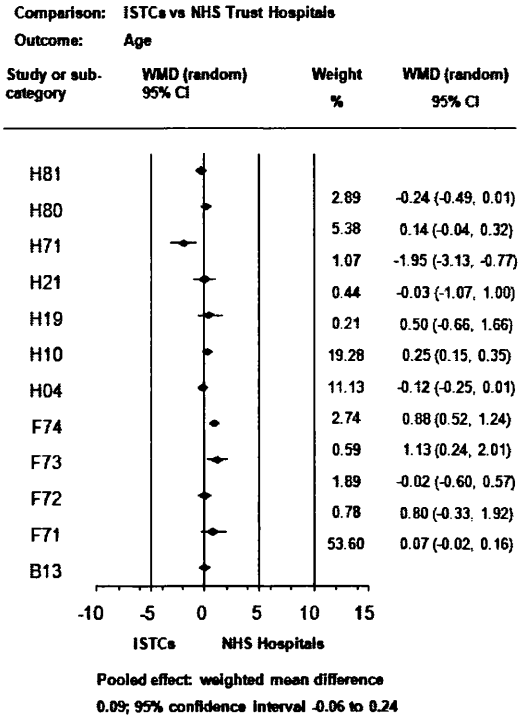


Figure F.3: Forest plot for Patient Age (Years): ISTCs vs. IS Providers (2007)

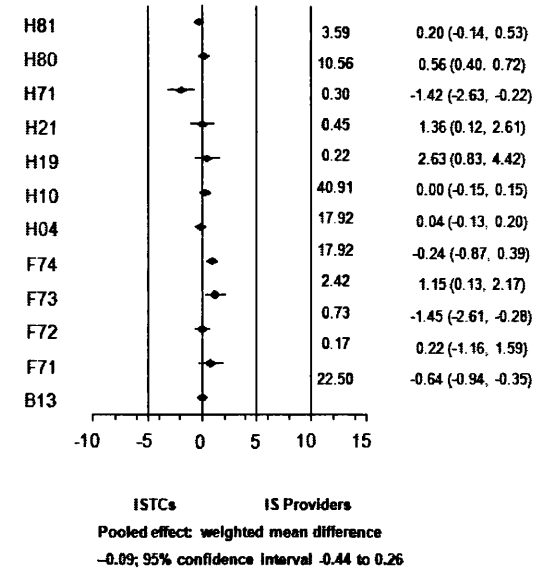


Figure F.4: Forest plot for Patient Age (Years): IS Providers vs. NHS TCs (2007)

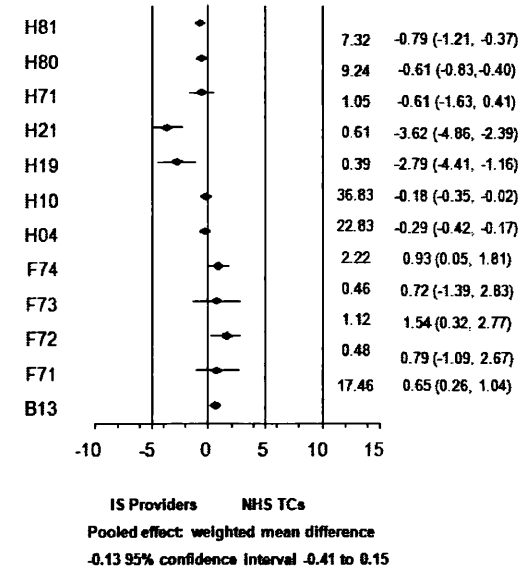
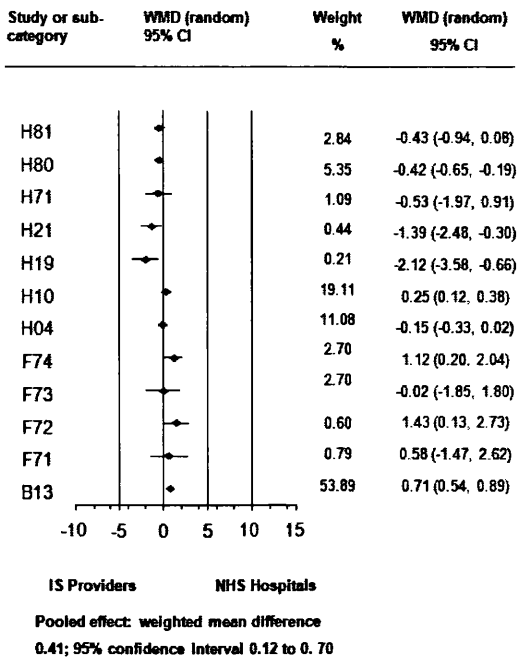


Figure F.5: Forest plot for Patient Age (Years): IS Providers vs. NHS Hospitals (2007)

Comparison: IS Providers vs. NHS Hospitals

Outcome: Age



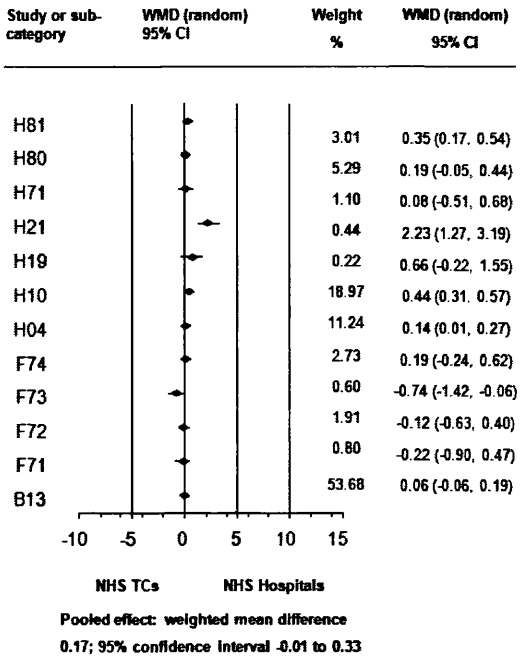
Pooled effect: weighted mean difference

0.41; 95% confidence interval 0.12 to 0. 70

Figure F.6: Forest plot for Patient Age (Years): NHS TCs vs NHS Hospitals (2007)

Comparison: NHS TCs vs NHS Hospitals

Outcome: Age



Pooled effect: weighted mean difference

0.17; 95% confidence interval -0.01 to 0.33

Appendix G: IMD (Income Deprivation)

Figure G.1: Forest plot for IMD (Income Deprivation): ISTCs vs. NHS TCs (2007)

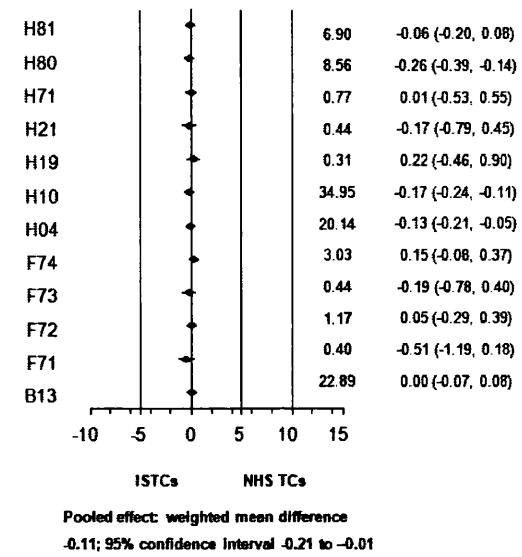


Figure G.2: Forest plot for IMD (Income Deprivation): ISTCs vs. NHS Hospitals (2007)

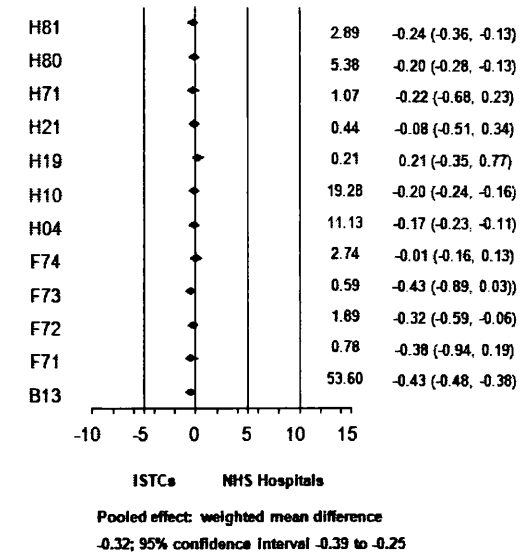


Figure G.3: Forest plot for IMD (Income Deprivation): ISTCs vs. IS Providers (2007)

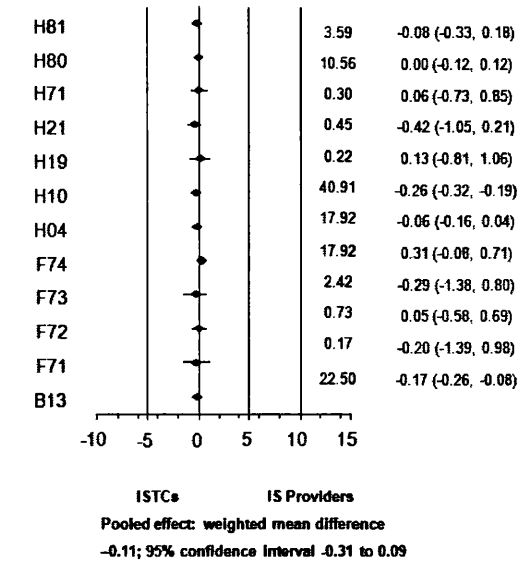


Figure G.4: Forest plot for IMD (Income Deprivation): IS Providers vs. NHS TCs (2007)

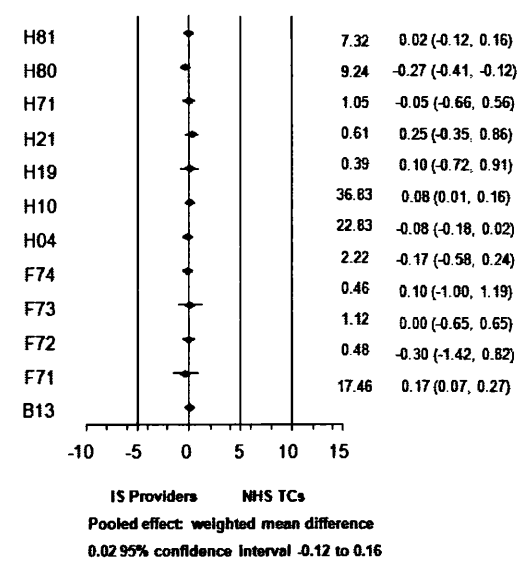


Figure G.5: Forest plot for IMD (Income Deprivation): IS Providers vs. NHS Hospitals (2007)

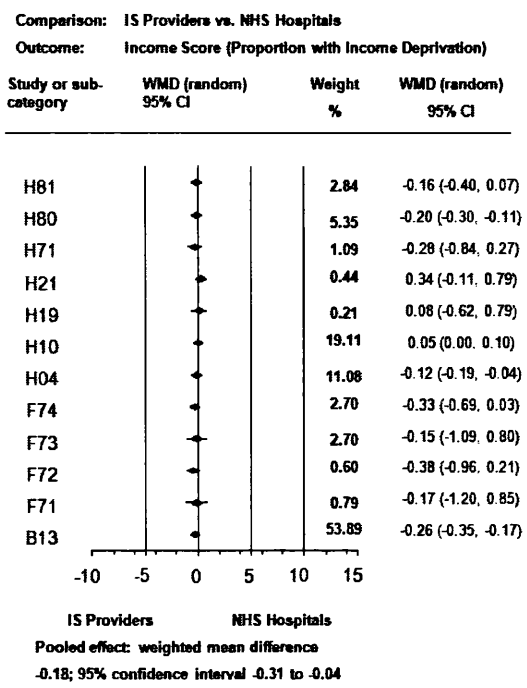
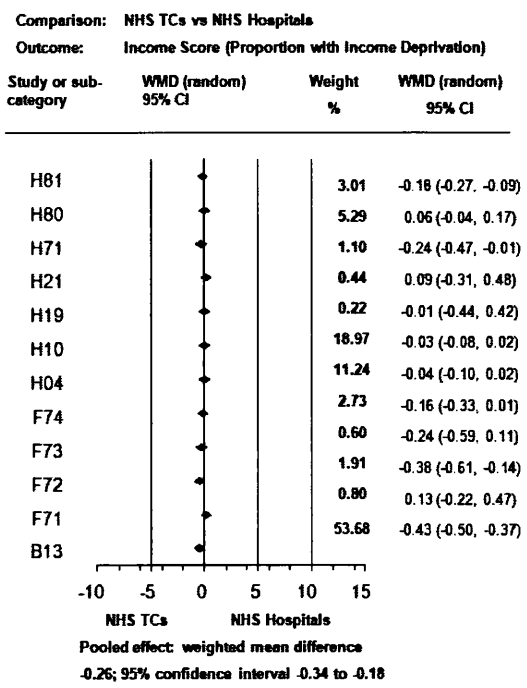


Figure G.6: Forest plot for IMD (Income Deprivation): NHS TCs vs NHS Hospitals (2007)



Appendix H: OLS (non log) Regression Analysis

Model Summary

HRG	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
B13	1	.008(a)	0.000	0.000	0.878
F71	1	.099(b)	0.010	0.009	5.438
F72	1	.257(c)	0.066	0.066	2.591
F73	1	.140(c)	0.020	0.018	1.940
F74	1	.182(c)	0.033	0.033	0.945
H04	1	.183(d)	0.034	0.033	5.067
H10	1	.103(c)	0.011	0.011	1.127
H19	1	.079(a)	0.006	0.002	2.150
H21	1	.088(b)	0.008	0.006	1.455
H71	1	.164(c)	0.027	0.026	16.400
H80	1	.178(d)	0.032	0.032	6.565
H81	1	.207(c)	0.043	0.042	4.859

a. Predictors: (Constant), deprivationID, ageBand, Ownership Status (private, public), Facility Type
b. Predictors: (Constant), deprivationID, Facility Type, ageBand, Ownership Status (private, public)
c. Predictors: (Constant), deprivationID, Ownership Status (private, public), ageBand, Facility type
d. Predictors: (Constant), deprivationID, ageBand, Facility type, Ownership Status (private, public)

ANOVA(e)

HRG	Model		Sum of Squares	df	Mean Square	F	Sig.
B13	1	Regression	10.604	4	2.651	3.442	.008(a)
		Residual	184,270.230	239,231	0.770		
		Total	184,280.834	239,235			
F71	1	Regression	1,027.605	4	256.901	8.686	.000(b)
		Residual	103,955.381	3,515	29.575		
		Total	104,982.986	3,519			
F72	1	Regression	4,025.116	4	1,006.279	149.872	.000(c)
		Residual	56,997.453	8,489	6.714		
		Total	61,022.569	8,493			
F73	1	Regression	202.657	4	50.664	13.461	.000(c)
		Residual	10,105.448	2,685	3.764		
		Total	10,308.104	2,689			
F74	1	Regression	378.901	4	94.725	106.077	.000(c)
		Residual	11,072.117	12,399	0.893		
		Total	11,451.018	12,403			
H04	1	Regression	46,731.460	4	11,682.865	455.082	.000(d)
		Residual	1,347,162.631	52,476	25.672		
		Total	1,393,894.091	52,480			
H10	1	Regression	1,242.125	4	310.531	244.281	.000(c)
		Residual	115,061.800	90,514	1.271		
		Total	116,303.925	90,518			
H19	1	Regression	28.713	4	7.178	1.552	.185(a)
		Residual	4,573.349	989	4.624		
		Total	4,602.061	993			
H21	1	Regression	33.689	4	8.422	3.979	.003(b)
		Residual	4,277.278	2,021	2.116		

		Total	4,310.967	2,025			
H71	1	Regression	36,303.170	4	9,075.792	33.746	.000(c)
		Residual	1,313,264.830	4,883	268.946		
		Total	1,349,567.999	4,887			
H80	1	Regression	35,426.257	4	8,856.564	205.487	.000(d)
		Residual	1,081,516.080	25,093	43.100		
		Total	1,116,942.337	25,097			
H81	1	Regression	14,542.855	4	3,635.714	153.990	.000(c)
		Residual	326,031.683	13,809	23.610		
		Total	340,574.538	13,813			

a. Predictors: (Constant), deprivationID, ageBand, Ownership Status (private, public), Facility type
b. Predictors: (Constant), deprivationID, Facility type, ageBand, Ownership Status (private, public)
c. Predictors: (Constant), deprivationID, Ownership Status (private, public), ageBand, Facility type
d. Predictors: (Constant), deprivationID, ageBand, Facility type, Ownership Status (private, public)
e. Dependent Variable: los

Coefficients(a)

			Unstandardised Coefficients		Standardised Coefficients			Correlations			Collinearity Statistics	
HRG	Model		B	Std. Error	Beta	t	Sig.	Part	Tolerance	VIF	B	Std. Error
B13	1	(Constant)	0.016	0.019		0.875	0.382					
		Ownership Status (private, public)	0.012	0.020	0.002	0.585	0.559	0.004	0.001	0.001	0.491	2.038
		Facility type	0.022	0.018	0.004	1.226	0.220	0.005	0.003	0.003	0.491	2.039
		ageBand	-0.001	0.001	-0.004	-2.021	0.043	-0.004	-0.004	-0.004	0.999	1.001
		deprivationID	0.002	0.001	0.004	1.780	0.075	0.004	0.004	0.004	0.997	1.003
F71	1	(Constant)	-0.243	1.165		-0.209	0.835					
		Ownership Status (private, public)	1.760	1.115	0.030	1.579	0.114	0.052	0.027	0.027	0.800	1.249
		Facility type	1.655	0.663	0.047	2.495	0.013	0.060	0.042	0.042	0.801	1.248
		ageBand	0.000	0.034	0.000	0.012	0.990	-0.009	0.000	0.000	0.987	1.013
		deprivationID	0.290	0.067	0.073	4.346	0.000	0.074	0.073	0.073	0.987	1.013
F72	1	(Constant)	-2.553	0.258		-9.882	0.000					
		Ownership Status (private, public)	0.830	0.284	0.038	2.924	0.003	0.064	0.032	0.031	0.645	1.550
		Facility type	0.700	0.208	0.044	3.370	0.001	0.071	0.037	0.035	0.644	1.552
		ageBand	0.206	0.009	0.238	22.656	0.000	0.232	0.239	0.238	0.994	1.006
		deprivationID	0.149	0.020	0.078	7.407	0.000	0.064	0.080	0.078	0.993	1.007
F73	1	(Constant)	-0.758	0.395		-1.921	0.055					
		Ownership Status (private, public)	0.518	0.357	0.033	1.448	0.148	0.064	0.028	0.028	0.712	1.404
		Facility type	0.579	0.242	0.054	2.389	0.017	0.076	0.046	0.046	0.713	1.402
		ageBand	0.029	0.014	0.039	2.046	0.041	0.026	0.039	0.039	0.985	1.015
		deprivationID	0.161	0.028	0.112	5.817	0.000	0.111	0.112	0.111	0.986	1.014
F74	1	(Constant)	-0.492	0.057		-8.654	0.000					

		Ownership Status (private, public)	0.132	0.065	0.025	2.036	0.042	0.037	0.018	0.018	0.506	1.978
		Facility type	0.118	0.054	0.027	2.199	0.028	0.040	0.020	0.019	0.506	1.977
		ageBand	0.045	0.002	0.165	18.621	0.000	0.155	0.165	0.164	0.987	1.013
		deprivationID	0.056	0.006	0.082	9.280	0.000	0.066	0.083	0.082	0.989	1.011
H04	1	(Constant)	0.262	0.157		1.663	0.096					
		Ownership Status (private, public)	1.583	0.109	0.074	14.584	0.000	0.104	0.064	0.063	0.717	1.394
		Facility type	0.980	0.095	0.052	10.271	0.000	0.092	0.045	0.044	0.718	1.394
		ageBand	0.235	0.008	0.134	31.109	0.000	0.135	0.135	0.134	1.000	1.000
		deprivationID	0.204	0.017	0.053	12.362	0.000	0.057	0.054	0.053	0.999	1.001
H10	1	(Constant)	-0.310	0.021		-14.678	0.000					
		Ownership Status (private, public)	0.058	0.017	0.014	3.397	0.001	0.025	0.011	0.011	0.632	1.583
		Facility type	0.082	0.017	0.020	4.751	0.000	0.027	0.016	0.016	0.631	1.584
		ageBand	0.032	0.001	0.096	28.887	0.000	0.093	0.096	0.096	0.994	1.006
		deprivationID	0.028	0.003	0.034	10.201	0.000	0.028	0.034	0.034	0.994	1.006
H19	1	(Constant)	0.425	0.463		0.919	0.359					
		Ownership Status (private, public)	-0.058	0.393	-0.005	-0.146	0.884	0.027	-0.005	-0.005	0.797	1.254
		Facility type	0.642	0.307	0.074	2.092	0.037	0.073	0.066	0.066	0.796	1.256
		ageBand	-0.019	0.024	-0.025	-0.779	0.436	-0.029	-0.025	-0.025	0.992	1.008
		deprivationID	0.023	0.050	0.015	0.468	0.640	0.014	0.015	0.015	0.999	1.001
H21	1	(Constant)	1.514	0.218		6.959	0.000					
		Ownership Status (private, public)	-0.226	0.188	-0.030	-1.202	0.229	-0.012	-0.027	-0.027	0.770	1.298
		Facility type	0.305	0.176	0.044	1.729	0.084	0.035	0.038	0.038	0.768	1.303
		ageBand	-0.032	0.010	-0.074	-3.308	0.001	-0.077	-0.073	-0.073	0.979	1.021
		deprivationID	-0.019	0.023	-0.019	-0.840	0.401	-0.012	-0.019	-0.019	0.992	1.008
H71	1	(Constant)	-5.513	2.524		-2.185	0.029					
		Ownership Status (private, public)	3.764	2.364	0.024	1.592	0.111	0.039	0.023	0.022	0.885	1.130
		Facility type	2.090	1.388	0.023	1.505	0.132	0.035	0.022	0.021	0.886	1.129
		ageBand	0.749	0.069	0.154	10.876	0.000	0.154	0.154	0.154	0.997	1.003
		deprivationID	0.517	0.177	0.041	2.925	0.003	0.037	0.042	0.041	0.998	1.002
H80	1	(Constant)	-0.696	0.291		-2.390	0.017					
		Ownership Status (private, public)	2.025	0.198	0.080	10.244	0.000	0.111	0.065	0.064	0.626	1.598
		Facility type	1.157	0.202	0.045	5.731	0.000	0.093	0.036	0.036	0.626	1.597

		ageBand	0.288	0.014	0.129	20.710	0.000	0.128	0.130	0.129	0.999	1.001
		deprivationID	0.225	0.031	0.045	7.174	0.000	0.048	0.045	0.045	0.998	1.002
H81	1	(Constant)	-0.636	0.299		-2.122	0.034					
		Ownership Status (private, public)	0.976	0.227	0.042	4.300	0.000	0.089	0.037	0.036	0.741	1.349
		Facility type	1.300	0.156	0.081	8.336	0.000	0.102	0.071	0.069	0.741	1.350
		ageBand	0.289	0.015	0.163	19.507	0.000	0.159	0.164	0.162	0.996	1.004
		deprivationID	0.264	0.031	0.071	8.531	0.000	0.069	0.072	0.071	0.995	1.005

a. Dependent Variable: los

Collinearity Diagnostics(a)

					Variance Proportions				
HRG	Model	Dimension	Eigenvalue	Condition Index	Facility type	ageBand	deprivationID	(Constant)	Ownership Status (private, public)
B13	1	1	4.820	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.140	5.863	0.00	0.00	0.00	0.01	0.97
		3	0.027	13.282	0.00	0.05	0.08	0.55	0.00
		4	0.007	25.758	0.86	0.00	0.27	0.41	0.02
		5	0.005	30.585	0.13	0.95	0.65	0.03	0.00
F71	1	1	4.808	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.148	5.692	0.00	0.00	0.01	0.02	0.93
		3	0.029	12.858	0.00	0.01	0.21	0.65	0.02
		4	0.011	20.682	0.13	0.15	0.75	0.23	0.04
		5	0.004	35.888	0.87	0.84	0.03	0.10	0.01
F72	1	1	4.773	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.147	5.695	0.00	0.00	0.00	0.07	0.88
		3	0.060	8.906	0.01	0.02	0.06	0.78	0.07
		4	0.013	18.935	0.37	0.04	0.72	0.11	0.03
		5	0.006	27.533	0.62	0.93	0.22	0.04	0.01
F73	1	1	4.803	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.145	5.754	0.00	0.00	0.01	0.01	0.93
		3	0.033	12.064	0.00	0.02	0.29	0.44	0.01
		4	0.013	19.013	0.13	0.27	0.64	0.29	0.03
		5	0.006	28.722	0.87	0.70	0.06	0.25	0.03
F74	1	1	4.705	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.167	5.312	0.00	0.00	0.00	0.12	0.79
		3	0.096	6.986	0.00	0.03	0.06	0.62	0.09
		4	0.020	15.301	0.68	0.01	0.43	0.22	0.10
		5	0.011	20.359	0.32	0.96	0.51	0.03	0.01
H04	1	1	4.733	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.156	5.514	0.00	0.02	0.04	0.00	0.88
		3	0.065	8.529	0.03	0.05	0.30	0.24	0.07
		4	0.033	12.063	0.00	0.83	0.64	0.03	0.00
		5	0.014	18.558	0.96	0.09	0.02	0.72	0.04
H10	1	1	4.668	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.173	5.188	0.00	0.02	0.02	0.03	0.86
		3	0.103	6.743	0.01	0.09	0.10	0.47	0.00
		4	0.032	12.043	0.00	0.81	0.80	0.00	0.00

		5	0.024	13.890	0.99	0.08	0.08	0.50	0.13
H19	1	1	4.715	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.162	5.396	0.00	0.01	0.02	0.02	0.90
		3	0.078	7.755	0.00	0.02	0.21	0.59	0.00
		4	0.029	12.773	0.07	0.46	0.76	0.18	0.02
		5	0.016	17.133	0.93	0.51	0.01	0.20	0.07
H21	1	1	4.684	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.180	5.097	0.00	0.00	0.00	0.12	0.80
		3	0.097	6.948	0.00	0.04	0.08	0.68	0.10
		4	0.022	14.522	0.01	0.68	0.78	0.04	0.00
		5	0.017	16.655	0.99	0.27	0.13	0.16	0.09
H71	1	1	4.782	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.154	5.564	0.00	0.00	0.01	0.02	0.95
		3	0.041	10.809	0.00	0.01	0.22	0.72	0.01
		4	0.017	16.648	0.10	0.16	0.77	0.20	0.02
		5	0.005	30.000	0.89	0.83	0.00	0.06	0.01
H80	1	1	4.726	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.162	5.405	0.00	0.03	0.03	0.00	0.88
		3	0.069	8.280	0.04	0.14	0.12	0.23	0.07
		4	0.029	12.784	0.00	0.81	0.79	0.00	0.00
		5	0.014	18.436	0.96	0.01	0.06	0.76	0.05
H81	1	1	4.712	1.000	0.00	0.00	0.00	0.00	0.01
		2	0.166	5.333	0.00	0.01	0.05	0.01	0.89
		3	0.079	7.725	0.02	0.00	0.53	0.16	0.05
		4	0.030	12.496	0.00	0.74	0.42	0.23	0.00
		5	0.013	18.817	0.97	0.24	0.00	0.60	0.05

a. Dependent Variable: los

Appendix I: Means and Median Analysis

Figure I.1 Box Plot – HRG 71

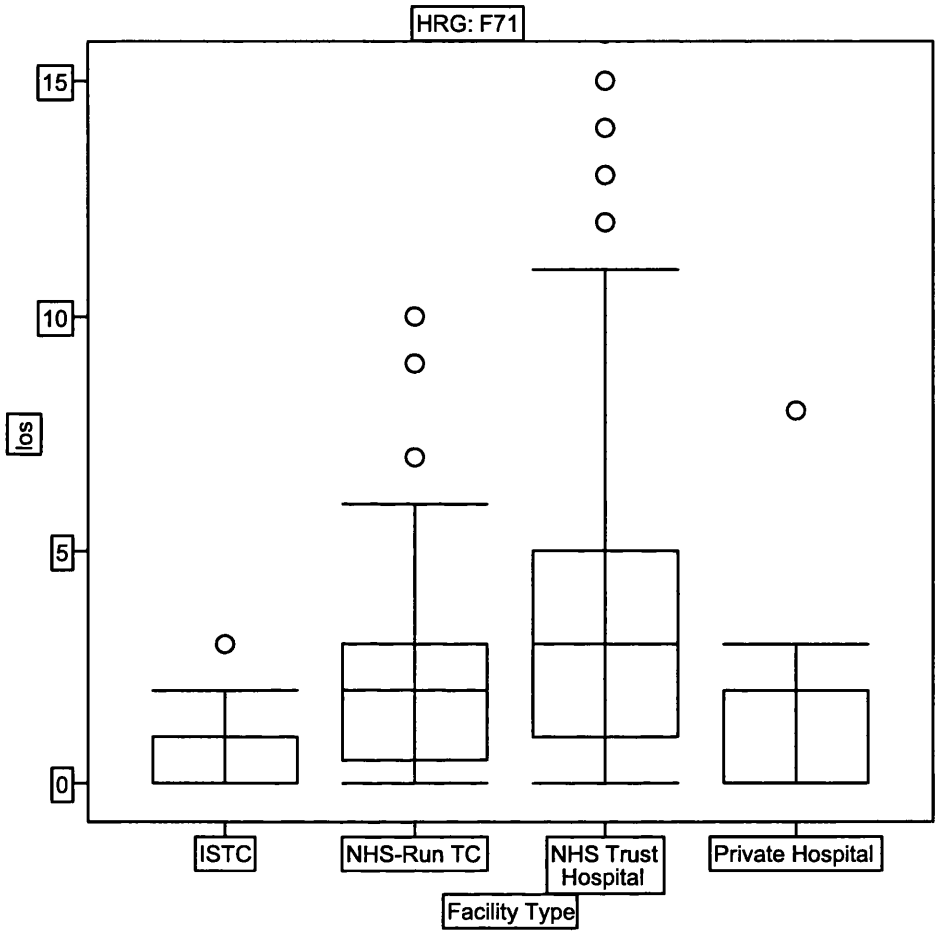


Figure I.2 Box Plot – F72

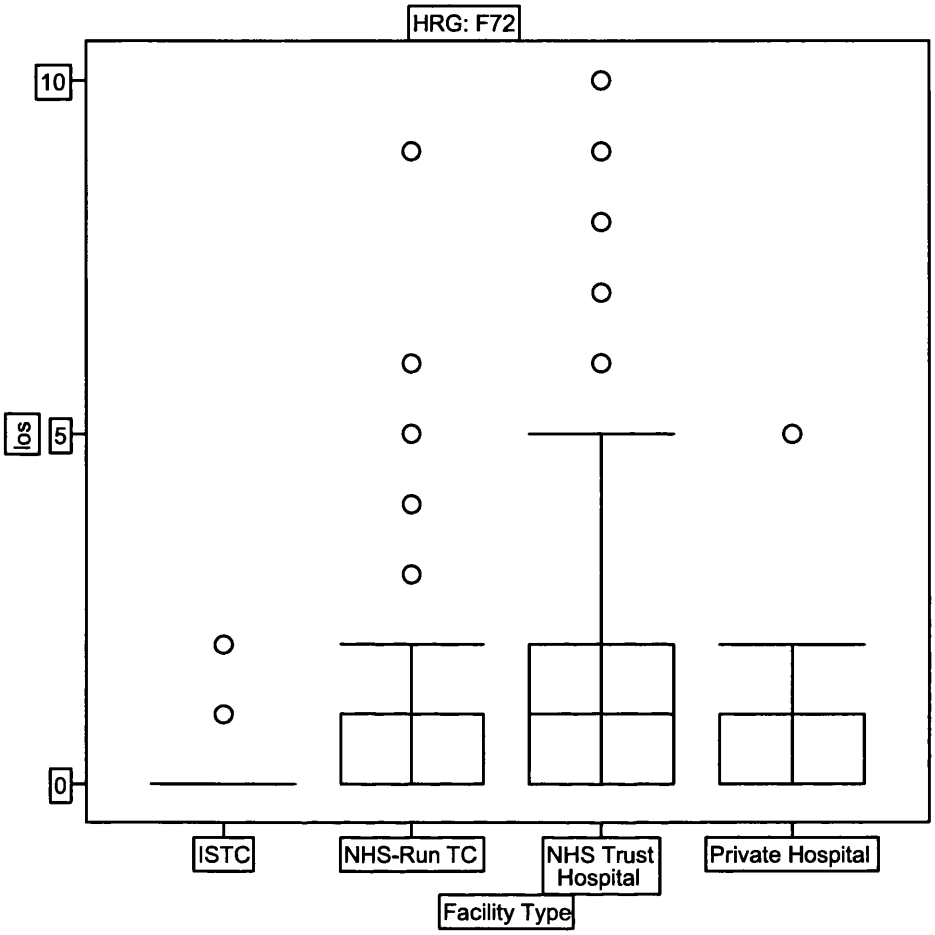


Figure I.3 Box Plot – F73

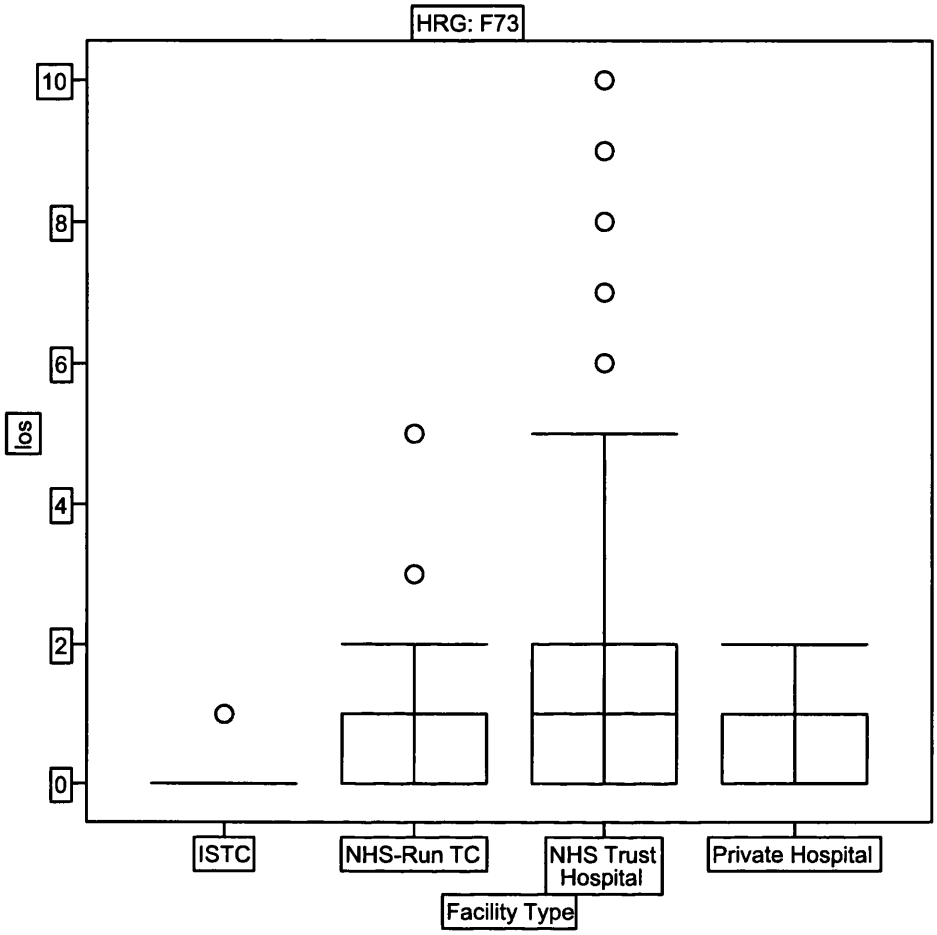


Figure I.4 Box Plot – F74

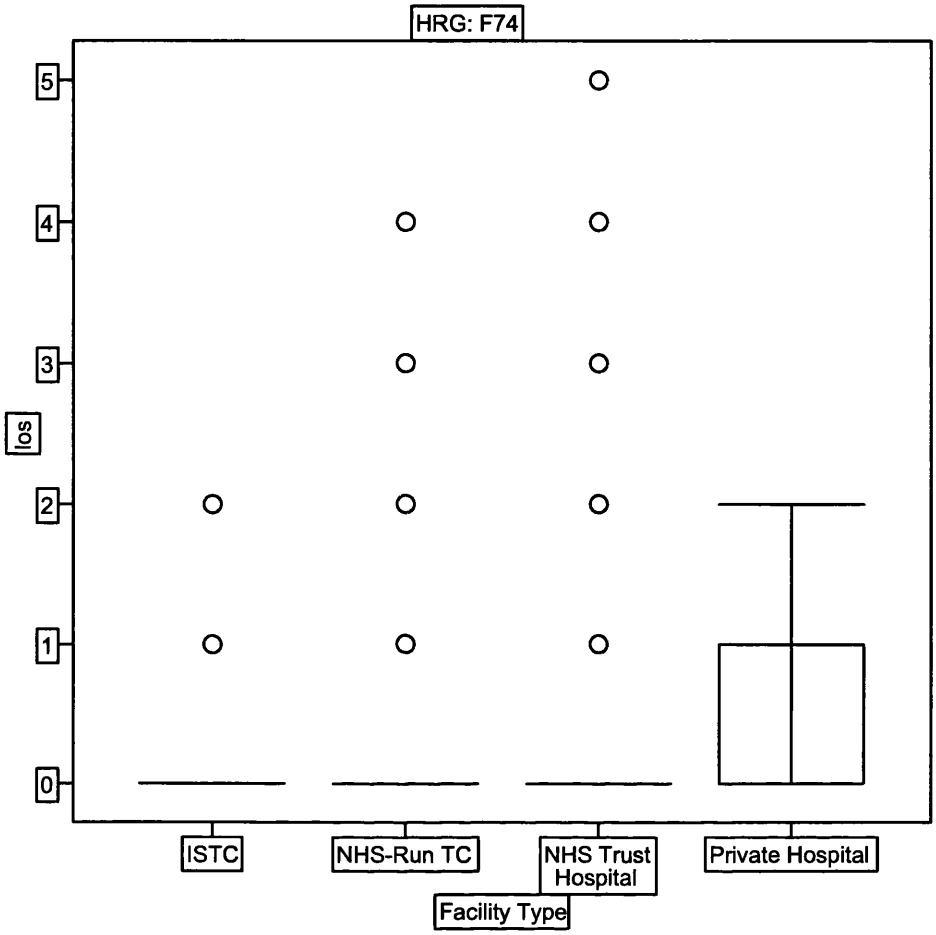


Figure I.5 Box Plot – H04

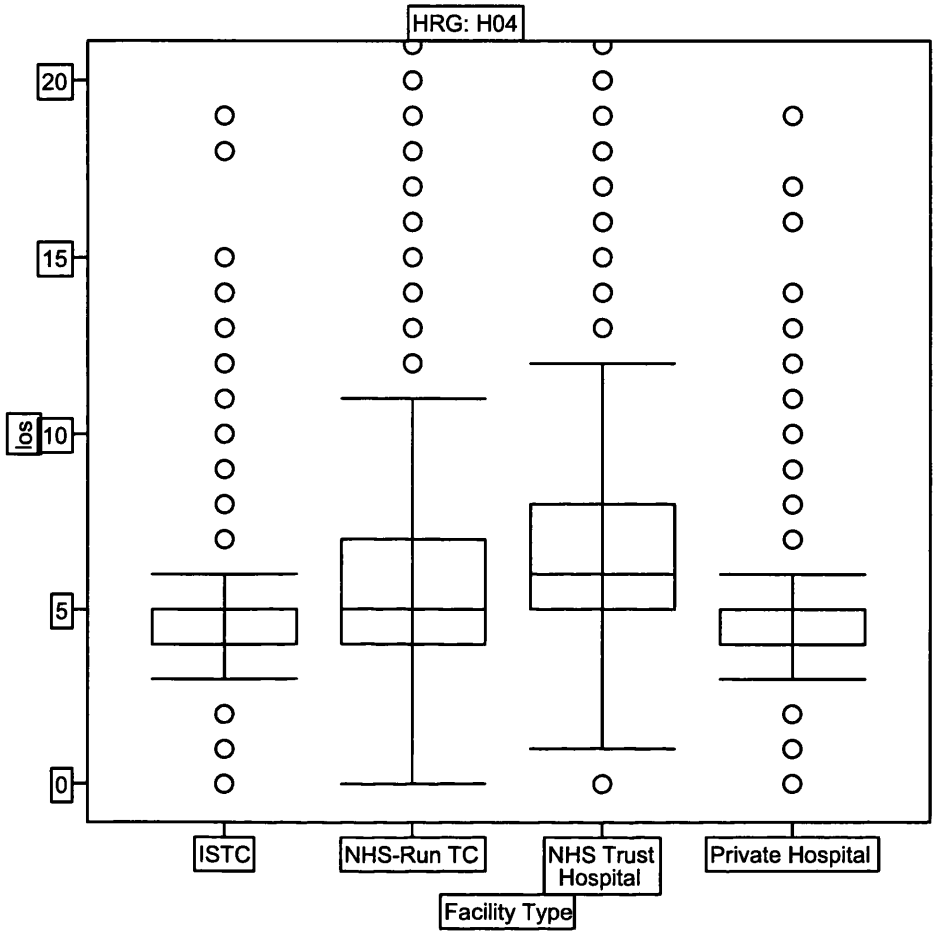


Figure I.6 Box Plot – H10

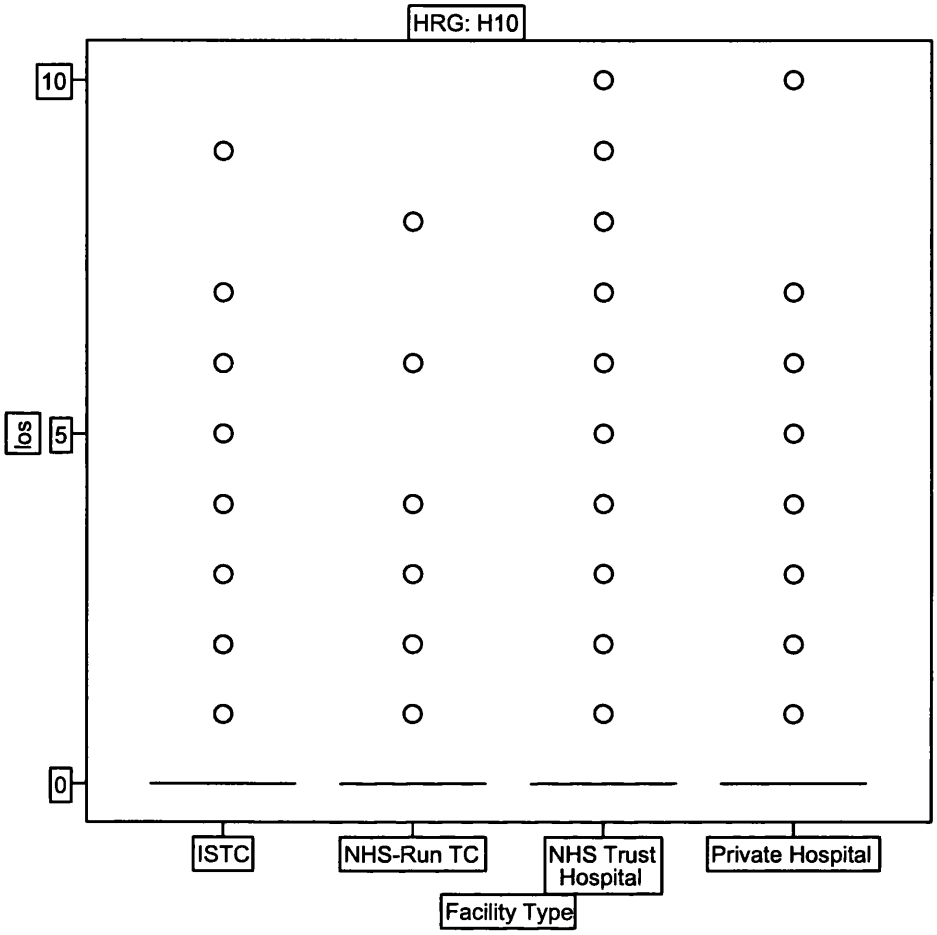


Figure I.7 Box Plot – H19

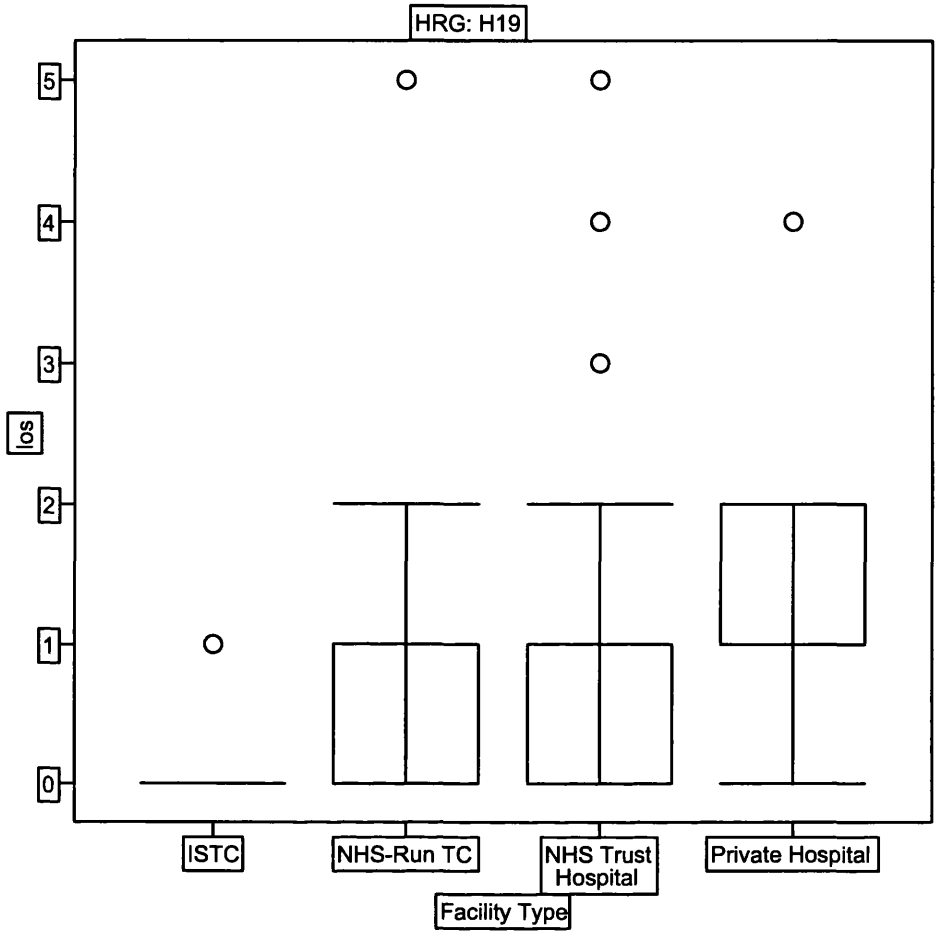


Figure I.8 Box Plot – H21

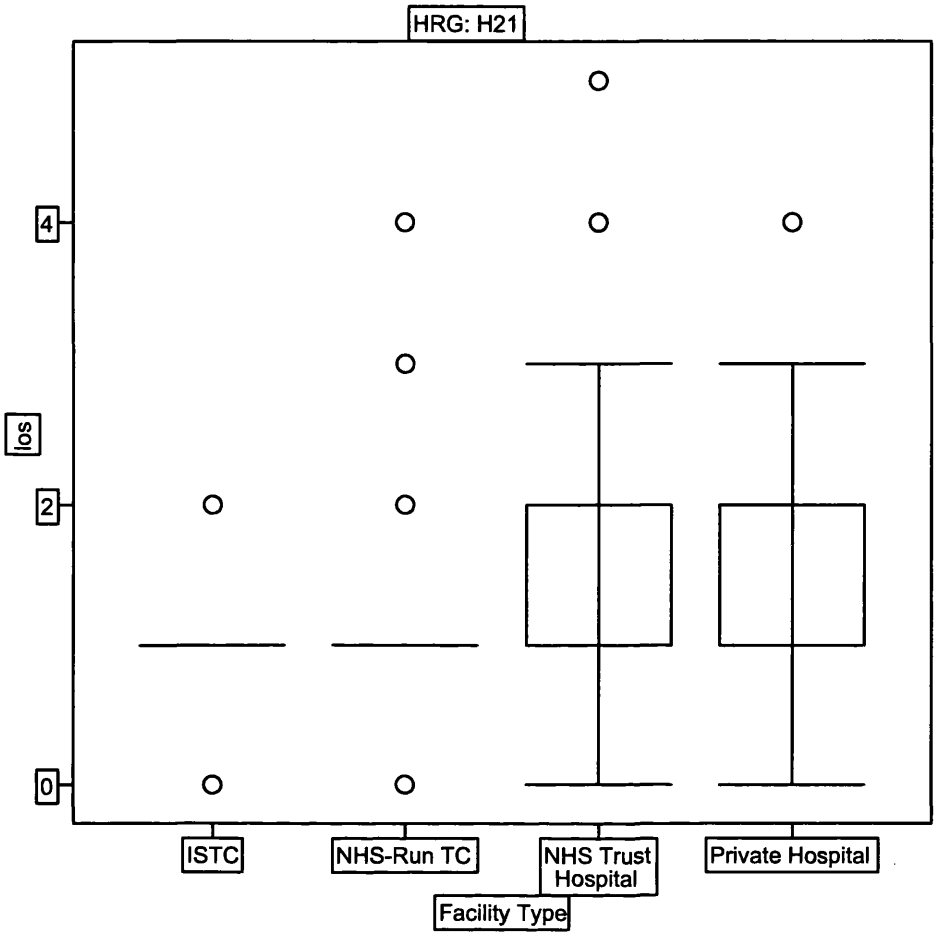


Figure I.9 Box Plot – H71

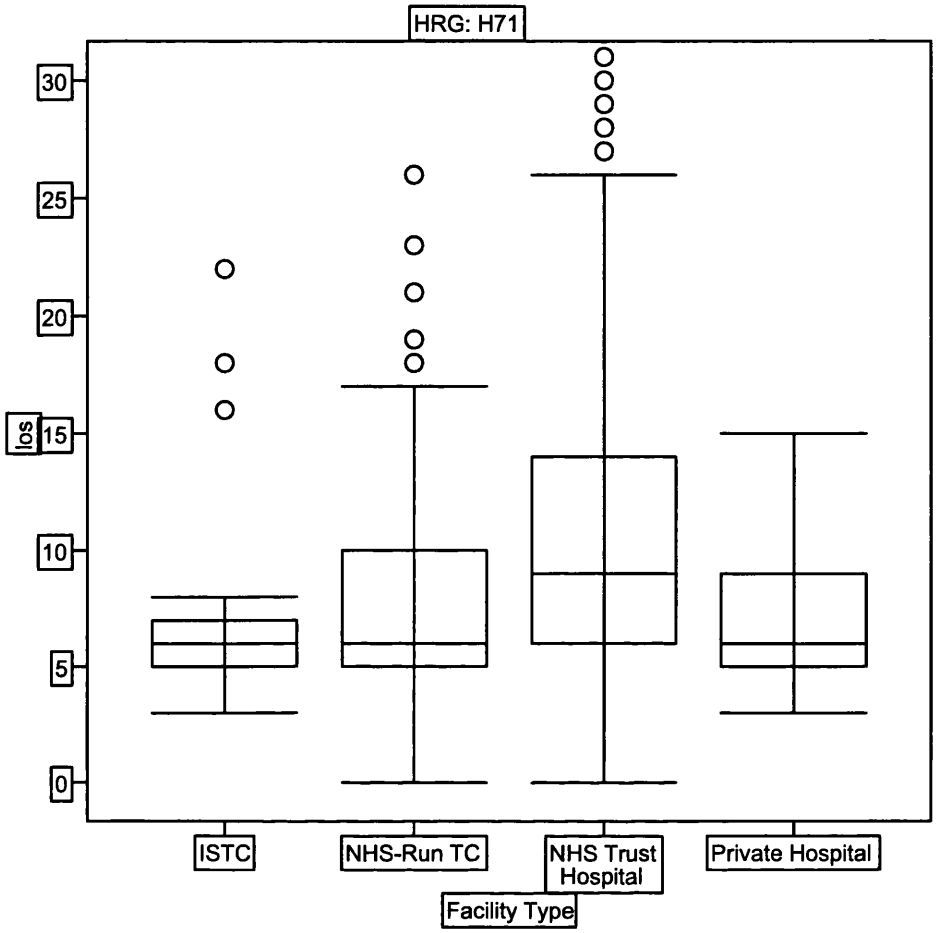


Figure I.10 Box Plot – H80

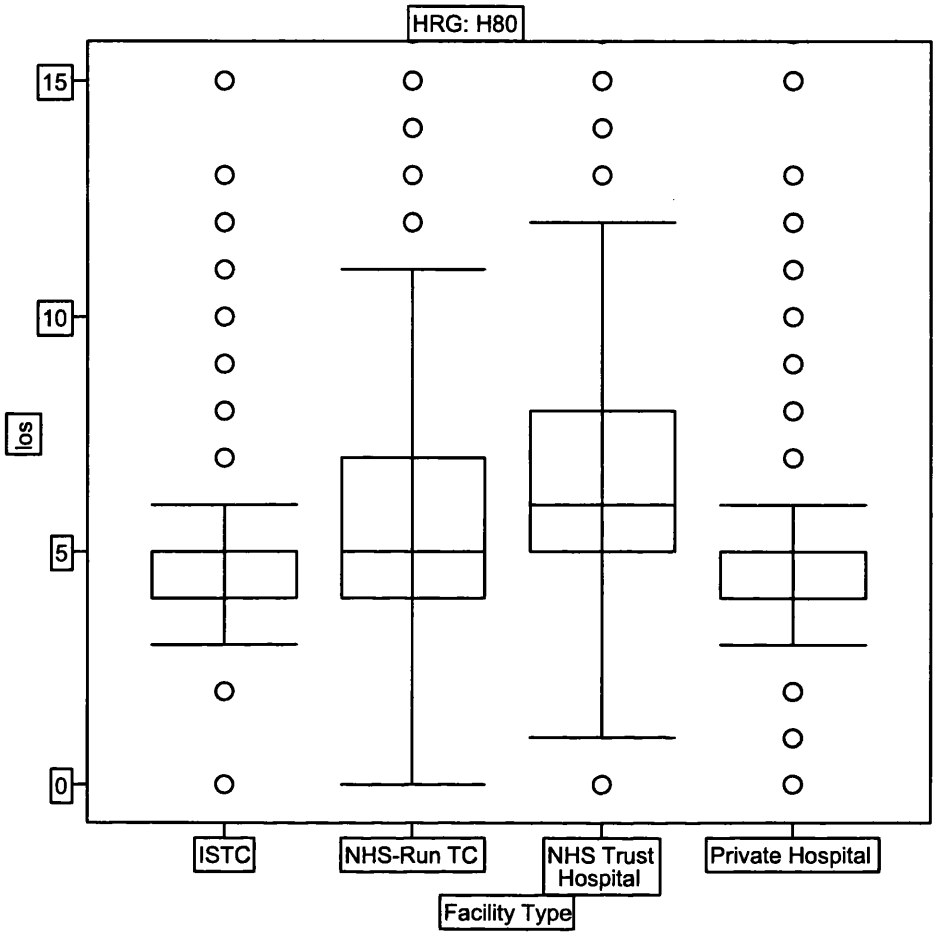
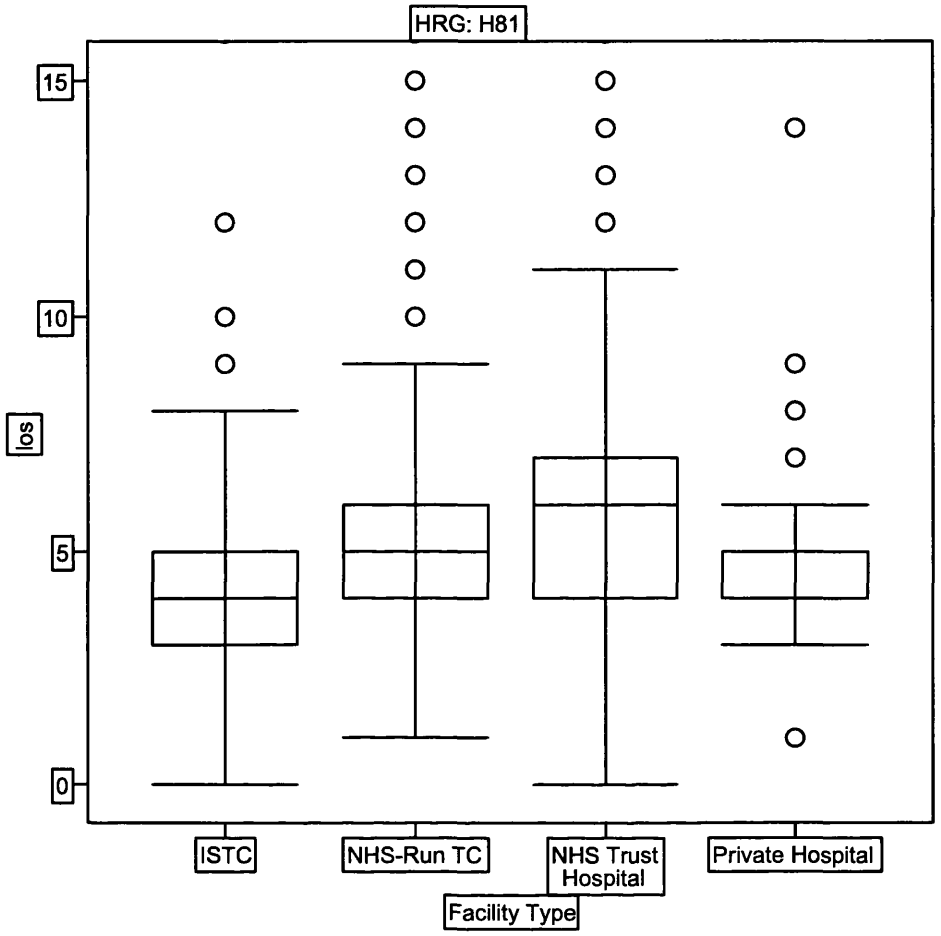


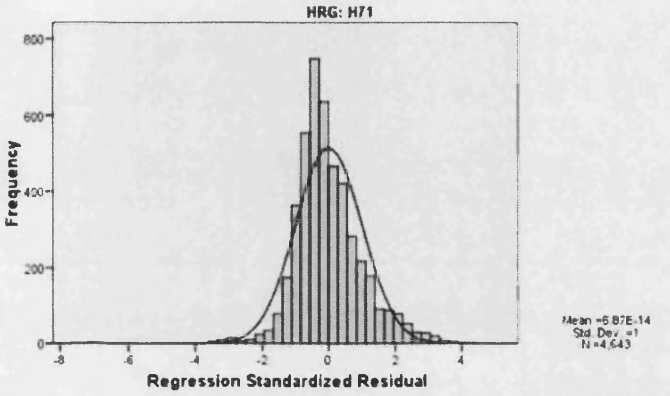
Figure I.11 Box Plot – H81



Appendix J: Histogram and P-P Plots (log)

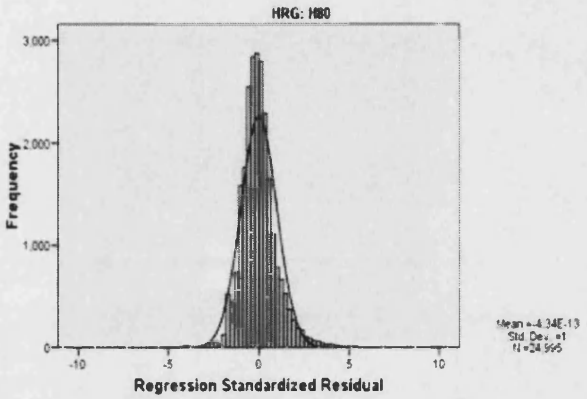
Histogram

Figure J.1
Dependent Variable: ALOSLOG



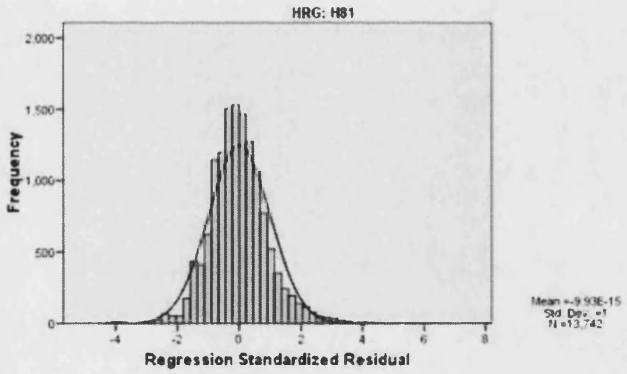
Histogram

Figure J.2
Dependent Variable: ALOSLOG



Histogram

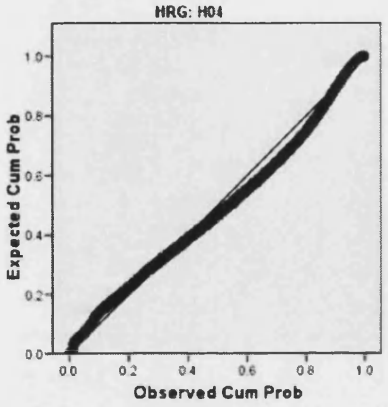
Figure J.3
Dependent Variable: ALOSLOG



Normal P-P Plot of Regression Standardized Residual

Figure J.4

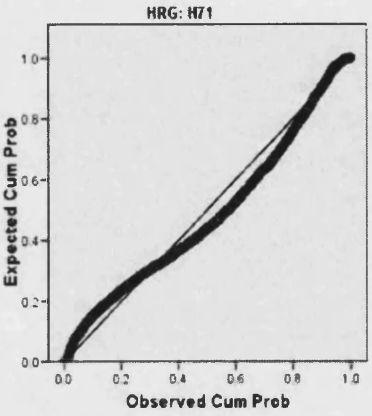
Dependent Variable: ALOSLOG



Normal P-P Plot of Regression Standardized Residual

Figure J.5

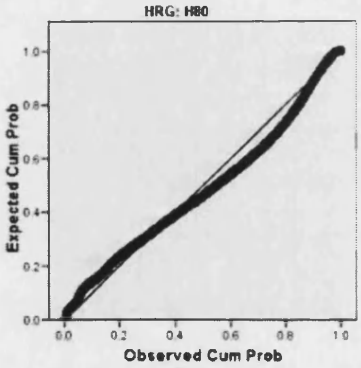
Dependent Variable: ALOSLOG



Normal P-P Plot of Regression Standardized Residual

Figure J.6

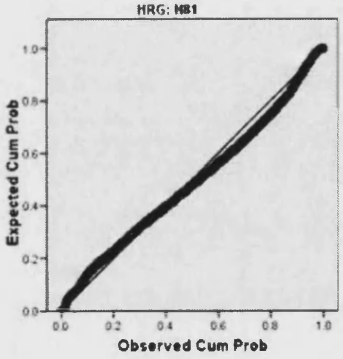
Dependent Variable: ALOSLOG



Normal P-P Plot of Regression Standardized Residual

Figure J.7

Dependent Variable: ALOSLOG



Appendix K: Total Number of Providers in Competition Area

		10 MILES	30 MILES
Facility Name	SHA	Total Providers	Total Providers
Daventry	East Midlands	1	7
Redwood	South East Coast	4	39
Cobalt	North East	3	9
Gainsborough	East Midlands	2	2
Boston	East Midlands	1	1
Bodmin	South West	1	3
Reading	South Central	6	14
Clifton	Yorkshire and The Humber	2	2
New Hall	South Central	2	8
Kidderminster	West Midlands	4	14
High Wycombe	South Central	2	17
Medway	South East Coast	2	8
Portsmouth	South Central	3	9
Eccleshill	Yorkshire and The Humber	4	13
Greater Manchester	North West	9	20
Shepton Mallet	South West	1	6
Peninsula	South West	3	4
Barlborough	East Midlands	5	14
Torbay	South West	3	6
ParkNorth I	South Central	4	12
ParkNorth II	South Central	4	12
Royal Haslar	South Central	4	12
Chase PCT	South East Coast	6	17
Kings College	London	27	46
SW London	London	27	43
Ravenscourt	London	26	46
UCLH	London	29	47
Bromley/Orpington	London	11	42
Newham PCT	London	26	44
Moorfields	London	24	47
ACAD	London	27	46
Frimley	South East Coast	4	14
Royal Berkshire	South Central	3	14
Dartford/Woodland NHS Treatment Centre	South East Coast	10	34
Princess Alexandra	East of England	4	39
Milton Keynes	South Central	1	6
Bury St. Edmond	East of England	2	3
Erewash	East Midlands	7	17
Bishop Auckland	North East	2	8

Wrightington	North West	5	21
Wrightington PCT	North West	5	21
Southport and Ormskirk	North West	7	13
South Devon TC	South West	3	6
MYH NHS Trust	Yorkshire and The Humber	3	11
MCHT	North West	2	14

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