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Awarding NHS contracts to private providers decreased local NHS provision and increased inequalities: Scottish case study of elective hip arthroplasty

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## Abstract

**Background** This is the first research to examine how the policy of patient choice and commercial contracting where NHS funds are given to private providers to tackle waiting times, impacted on direct NHS provision and treatment inequalities.

**Methods** An ecological study of NHS funded elective primary hip arthroplasties in Scotland using routinely collected inpatient data 01 April 1993 to 31 March 2013.

**Results** Increased use of private sector provision by NHS Boards was associated with a significant decrease in direct NHS provision in 2008/09 ( $P < 0.01$ ) and with widening inequalities by age and socio-economic deprivation. National treatment rate fell from 143.8 (140.3, 147.3) per 100 000 in 2006/07 to 137.8 (134.4, 141.2) per 100 000 in 2007/08. By 2012/13 territorial NHS Boards had not recovered 2006/07 levels of provision; this was most marked for NHS Boards with greatest use of private sector, namely Fife, Grampian and Lothian. Patients aged 85 years and over or living in the more deprived areas of Scotland appear to have been disadvantaged since the onset of patient choice in 2002.

**Conclusions** NHS funding of private sector provision for elective hip arthroplasty was associated with a decrease in public provision and may have contributed to an increase in age and socio-economic inequalities in treatment rates.

## Background

England's NHS Plan 2000 set out a clear agenda for the privatisation of NHS services under the rubric of patient choice and in the absence of an evidence base.<sup>1</sup> Following on, "Partnership for Care - Scotland's Health White Paper", February 2003 invoked spare capacity in the private sector as a means of treating patients whose waiting times exceeded the national guaranteed limit: nine months for inpatient treatment in 2003; 18 weeks from referral to treatment in 2011; and 12 weeks from agreeing to treatment to receiving treatment in 2012.<sup>2-4</sup> Once again no evidence was given in support of the policy of giving patients a choice of provider although fulfilling the terms of the European Union directive on cross border healthcare and undue delay was a crucial element.<sup>5</sup> Within Scotland choice took the form of other territorial NHS Boards, the NHS Golden Jubilee National Hospital (GJNH) or the private sector with the intention that this would "complement and not detract from NHS Boards' corporate responsibility to develop sustainable local solutions to long waits". In June 2005, Andy Kerr, then Labour MSP and minister for health informed the Scottish Parliament that he and the National Waiting Times Unit (NHS) had held talks with 27 separate private healthcare providers in 2004 and 2005 about providing additional capacity and innovative solutions to reduce waiting times for elective surgery.<sup>6,7</sup> In November 2006 the first block contract between the NHS and the private healthcare sector in Scotland was signed, prior to this England and Scotland had commissioned on a locally negotiated "spot purchase" basis.<sup>8</sup> This £18.7 million contract between NHS Tayside and South African healthcare company Netcare was for the Scottish Regional Treatment Centre, an Independent Sector Treatment Centre (ISTC) providing NHS funded diagnostics and elective treatments inside the buildings of Stracathro NHS Hospital.<sup>9</sup> The annual contract value for orthopaedic surgery and outpatient appointments was £4.37 million, of which £3.75 million was for hip and knee replacements with the rest classed as minor orthopaedics.<sup>10</sup> For Scotland as a whole over £373 million was spent on orthopaedics services in 2008/09, around four per cent of all NHS spending, however the split between public and private treatment is not collected centrally.<sup>11</sup>

The use of the private sector to deliver elective treatments to NHS funded patients in Scotland has been controversial due to poor value for money. In January 2010, the Scottish Government terminated the ISTC contract (Scotland's only ISTC contract to date) when academic analysis revealed a £1.6 million gap (62% of total cash paid) between what had been paid and what had been delivered in treatments to NHS patients in the first 13 months of operation.<sup>12</sup> Current Scottish government policy is to "effectively eliminate use of the private sector for planned care" although

recent figures show NHS Scotland spent £35.8 million on 12800 patient referrals to private hospitals in financial year 2013/14 compared to £22.8 million for 2239 referrals in 2011/12. <sup>13 14</sup>

The UK wide Equality Act 2010 introduced a public sector equality duty requiring public bodies to pay due regard to reducing inequalities related to socio-economic status, age and sex. <sup>15</sup> NHS Scotland advocates impact assessments to ensure that NHS Boards and other health bodies meet the requirements of the public sector equality duty when developing and delivering policies, practices and services. <sup>16</sup>

Inequalities and inequities in elective hip arthroplasty rates are well documented in England by sex, age and socioeconomic deprivation. <sup>17-24</sup> Women, older patients and those living in the most deprived areas receive fewer treatments relative to need. <sup>17 18 23 24</sup> Inequalities in treatment rates also exist in Scotland. <sup>25</sup> No change in socio-economic equity in hip replacement treatment was found between 2001 and 2008 during the period of increasing patient choice and use of private hospitals for elective care in England. <sup>26</sup>

There has been no study of the impact of patient choice in Scotland on inequalities in treatment. Hip arthroplasty is a high volume procedure with a relatively long length of stay in hospital and is a good choice of procedure to test inequality. <sup>26</sup>

The aims of this study are:

- 1) To analyse the effect that NHS funding of elective surgery in the private sector in Scotland had on local capacity for elective primary hip arthroplasty treatment.
- 2) To analyse variations in equality of access to elective primary hip arthroplasty by sex, age and socio-economic deprivation by provider type since the introduction of patient choice of provider (territorial NHS Boards; the GJNH; or the private sector).

## **Methods**

### Data sources

Numerators: Information Services Division (ISD) of NHS National Services Scotland provided an extract of secondary care admissions Scottish Morbidity Record (SMR01) data for NHS funded

elective primary hip arthroplasties (including hip resurfacing and hybrid hip replacements) on patients resident in Scotland from 01 April 1993 to the 31 March 2013 identified using OPCS-4.4 codes as used by the Scottish Arthroplasty Project.<sup>27</sup>

Denominators: Census estimates mid-year Scotland populations for the first part of the financial year, for example the mid-year population for 1993 was used for financial year 1993/94 and so on.

## Analysis

### Elective and Emergency Treatment Rates

Numbers and rates of elective and emergency hip arthroplasties were calculated by financial year (01 April to 31 March the following year) for all Scotland from 01 April 1993 to 31 March 2013 with 95% confidence intervals, directly standardised by age to the European Standard Population 2013.<sup>28</sup> Numbers and age standardised elective hip arthroplasty rates were also calculated separately by provider type.

### Trends by Provider Type

The number of treatments commissioned by each territorial NHS Board from either the NHS (a patient's own NHS Board, another territorial NHS Board or the GJNH) or the private sector were calculated by financial year along with numbers of treatments provided in-area (i.e. residents directly treated by their own NHS Board). The analysis ran from 01 April 2006 to 31 March 2010 to include the operation of the Scottish Regional Treatment Centre ISTC. Pearson's correlation coefficients were calculated comparing the change in the number of treatments commissioned from the NHS by each territorial NHS Board and the change in the number of treatments commissioned from the private sector by each territorial NHS Board, in 2007/08, 2008/09 and 2009/10 compared to 2006/07. Pearson's correlation coefficients were also calculated comparing the change in the number of in-area treatments provided by each territorial NHS Board and the change in the number of treatments commissioned by each territorial NHS Board from the private sector over the same time periods.

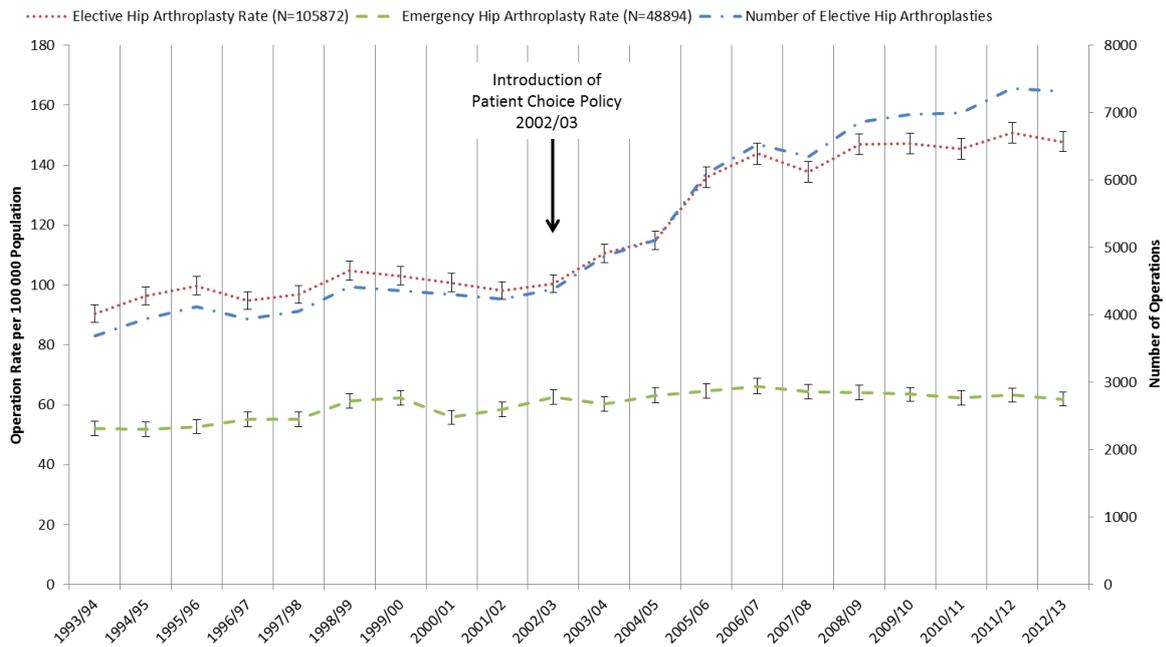
## Inequalities

Inequalities in elective hip arthroplasty treatment provision were analysed by sex, age and area-level socioeconomic deprivation using all domains of the Scottish Index of Multiple Deprivation 2012 (SIMD) with SIMD quintile one representing the 20% of the Scottish population living in the most socio-economically deprived areas. Data were used from 01 April 2002 to 31 March 2013 (the first recorded elective hip arthroplasty at the GJNH was in 2002/03 and there were only 10 NHS funded elective hip arthroplasties performed privately prior to financial year 2002/03, 1 in 1994/95, 2 in 1995/96 and 7 in 1996/97). Poisson regression models were built using forward selection in Stata version 12.1 to calculate adjusted incidence rate ratios (IRRs) on the total number of elective hip arthroplasties with covariates sex, age, SIMD and provider type offset by the total mid-year Scotland population years for the time period involved. Interactions were tested between provider type and the other three covariates and where interactions existed, models were built using dummy variables to estimate the effect of the interactions. Operation rates by age group and SIMD quintile were plotted against financial year of operation and the proportionate increase in 2012/13 compared to 2002/03 was calculated for each category.

## Results

### 1. Trends in treatment rates

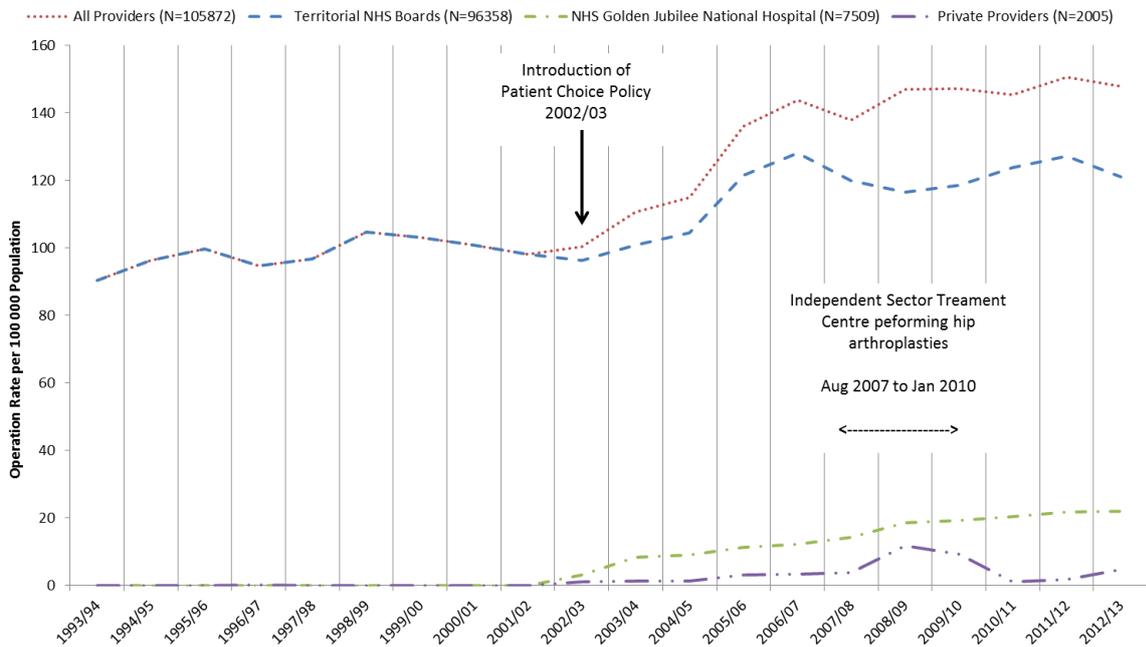
There were 105872 elective and 48894 emergency primary hip arthroplasties performed on patients resident in Scotland funded by NHS Scotland from 01 April 1993 to 31 March 2013. The age standardised elective hip arthroplasty rate rose from 90.4 treatments per 100000 population (95% confidence interval 87.5, 93.4) in 1993/94 to 100.4 (97.4, 103.3) per 100000 in 2002/03, rising steadily year on year until 2006/07 when it reached 143.8 (140.3, 147.3) per 100000 (see figure 1 and table A in Supplementary materials). There was a fall in the rate in 2007/08 to 137.8 (134.4, 141.2) per 100000 population before increasing again in 2008/09 to 146.9 (143.4, 150.4) per 100000 population. There is no statistically significant difference in the elective hip arthroplasty rates from 2008/09 onwards. There has been no significant change in the emergency hip arthroplasty rate since 2004/05.



**Fig. 1** NHS Scotland funded elective and emergency primary hip arthroplasties in Scotland. Number of operations and operation rates per 100 000 population directly age standardised to the 2013 European Standard Population by financial year of operation. Data source: Scottish Morbidity Record Information Services Division NHS Scotland (ISD).

## 2. Analysis of trends from 01 Apr 2006 to 31 Mar 2010 by provider type

The recovery in elective treatment rate in 2008/09 was the result of private sector activity rather than territorial NHS Board activity (see figure 2 and table A in Supplementary materials). The treatment rate for the territorial NHS Boards had not recovered to 2006/07 levels by 2011/12 or 2012/13 although the overall national rate recovered due to the additional capacity provided by the GJNH, a health board in its own right. In-area treatment rates were lower for Fife, Grampian, Highland and Lothian NHS Boards in 2011/12 and 2012/13 than 2006/07 (see Table B in Supplementary materials).



**Fig. 2** NHS Scotland funded elective primary hip arthroplasties in Scotland. Operation rates per 100 000 population directly age standardised to the 2013 European Standard Population by provider type and financial year of operation. Data source: Scottish Morbidity Record Information Services Division NHS Scotland (ISD).

There was a -3.2%, -0.9% and 2.4% change in the number of treatments commissioned by territorial NHS Boards from the NHS in 2007/08, 2008/09 and 2009/10 respectively compared to 2006/07 (see table C in Supplementary materials). Over the same time periods there was a -4.2%, -5.8% and -3.1% change in the number of treatments provided in-area by NHS Boards and a 13.5%, 248% and 181% change in the number of treatments commissioned from the private sector (see tables C & D in Supplementary materials). There is a significant negative correlation between the change in the number of treatments commissioned from the NHS by each territorial NHS Board and the change in the number of treatments commissioned from the private sector by each territorial NHS Board in 2008/09 (the peak of private sector activity) compared to 2006/07 (Pearson’s correlation coefficient -0.6911,  $p < 0.01$ ). Similarly there is a significant negative correlation between the change in the

number of treatments provided in-area by each territorial NHS Board and the change in the number of treatments commissioned by each territorial NHS Board from the private sector in 2008/09 compared to 2006/07 (-0.7900,  $p < 0.001$ ). There were no significant correlations for either of the two comparisons above for 2007/08 or 2009/10 compared to 2006/07 ( $p > 0.05$  for all).

### 3. Trends in inequality

A total of 68829 elective primary hip arthroplasties for patients resident in Scotland funded by NHS Scotland were carried out from 01 April 2002 to 31 March 2013.

The covariates sex, age, SIMD and provider type were all found to be significant predictors in the Poisson model on number of operations ( $p < 0.0001$  for all). A significant interaction with provider type was found for age and SIMD ( $p < 0.0001$  for both) but not for sex ( $p = 0.1661$ ). There are clear differences in the patterns of inequality by both age group and by SIMD quintile for the GJNH and private providers, both compared to territorial NHS Boards (see table 1 and figure A & B in Supplementary materials).

**Table 1. Number of Treatments (N) and Incidence Rate Ratios (IRR) with 95% Confidence Intervals for Interactions Between Age # Provider and Scottish Index of Multiple Deprivation 2012 (SIMD) # Provider Adjusted by Sex for NHS Funded Elective Primary Hip Arthroplasties for Patients Resident in Scotland 01 April 2002 to 31 March 2013 \***

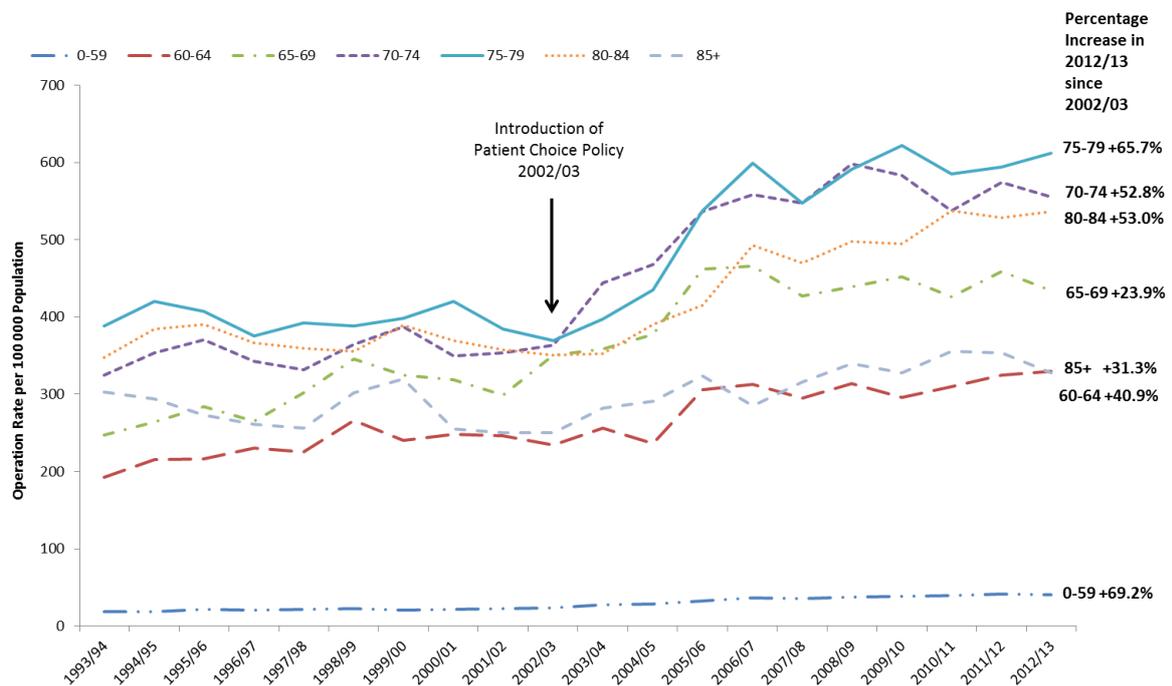
		Territorial NHS Boards		NHS Golden Jubilee National Hospital		Private Providers	
		N	IRR	N	IRR	N	IRR
<b>Age # Provider †</b>	<b>0-59 Years</b>	13667	1	1348	0.099 (0.093, 0.104)	368	0.027 (0.024, 0.030)
	<b>60-64 Years</b>	8149	1	1151	0.141 (0.133, 0.150)	363	0.045 (0.040, 0.049)
	<b>65-69 Years</b>	9837	1	1489	0.151 (0.143, 0.160)	418	0.042 (0.039, 0.047)
	<b>70-74 Years</b>	10364	1	1657	0.160 (0.152, 0.168)	411	0.040 (0.036, 0.044)
	<b>75-79 Years</b>	8729	1	1127	0.129 (0.121, 0.137)	285	0.033 (0.029, 0.037)
	<b>80-84 Years</b>	5454	1	554	0.102 (0.093, 0.111)	120	0.022 (0.018, 0.026)
	<b>85+ Years</b>	3109	1	181	0.058 (0.050, 0.068)	28	0.009 (0.006, 0.013)
<b>SIMD # Provider †</b>	<b>1 (most deprived)</b>	9761	1	1298	0.133 (0.125, 0.141)	276	0.028 (0.025, 0.032)
	<b>2</b>	11963	1	1727	0.144 (0.137, 0.152)	381	0.032 (0.029, 0.035)
	<b>3</b>	13183	1	1726	0.131 (0.125, 0.138)	411	0.031 (0.028, 0.034)
	<b>4</b>	13113	1	1477	0.113 (0.107, 0.119)	464	0.035 (0.032, 0.039)
	<b>5</b>	11289	1	1279	0.113 (0.107, 0.120)	461	0.041 (0.037, 0.045)
<b>Total ‡</b>		<b>59309</b>		<b>7507</b>		<b>1993</b>	

\* - results for sex with age or simd for each of the models can be found in Supplementary Materials Table E

† - also adjusted by age or SIMD as appropriate for model

‡ - there were 20 patients not included as SIMD was blank: 16 for Territorial NHS Boards; 2 for the GJNH; and 2 for private providers

There were differences in the proportionate increase in treatment rates by age group from 2002/03 to 2012/13 across all provider types: patients aged 75-79 years increased their treatment rate by 65.7%; those aged 85 years and over increased their treatment rate by 31.3% (see figure 3). Over the same time period, the two least deprived quintiles SIMD 4 and 5 increased their treatment rates by 67.3% and 85.4% respectively while the two most deprived quintiles SIMD 1 and 2 increased their treatment rates by 47.7% and 49.5% respectively (see figure C in Supplementary materials).



**Fig. 3** NHS Scotland funded elective primary hip arthroplasties in Scotland. Operation rates per 100 000 population by age group (years) and financial year of operation. Data source: Scottish Morbidity Record Information Services Division NHS Scotland (ISD).

## Discussion

Main finding of the study

The claim made by NHS Scotland's 2003 white paper that the additional use of the private sector would provide "sustainable local solutions to long waits" is not supported by the evidence. On the contrary, local provision by NHS Boards decreased and although median waiting times for elective hip replacement in Scotland fell from 156 days in 2005/06 to 78 days in 2009/10, the only increase in NHS capacity was at the GJNH.<sup>29</sup> Those NHS Boards with the greatest use of the private sector for elective surgery experienced the largest reductions in direct NHS provision and of those Fife, Grampian and Lothian NHS Boards had not recovered 2006/07 levels of in-area provision by 2012/13. Inequality in treatment rates have increased since 2002 with patients aged 85 years and over and those living in the more socio-economically deprived areas of Scotland significantly disadvantaged.

What is already known on this topic

#### 1. Provision

This is the first study to look at the impact of diverting NHS funds to the private sector on direct and in-area NHS provision. It confirms the conclusions of the 2006 House of Commons Health Select Committee (HSC) that in the English NHS, the private sector in the form of ISTCs "had not made a major direct contribution to increasing capacity".<sup>30</sup> Bernard Ribeiro, then president of the Royal College of Surgeons of England informed the committee that ISTCs were leaving "NHS facilities under-utilised with a concurrent deleterious effect on fragile NHS Trust financial balances".<sup>31</sup> In addition, ISTCs were being paid on referrals, not treatments, and consequently an estimated £252 million (14.8%) of the initial £1.7bn paid to the private sector under the English ISTC programme from 2003 to 2010 was for treatments and diagnostic procedures never carried out.<sup>32</sup>

Business cases and contracts for English ISTCs have been withheld or redacted by the Department of Health on grounds of commercial confidentiality making independent scrutiny, even by the HSC, impossible and as private sector organisations performing public functions, ISTCs are not subject to the Freedom of Information Act 2000.<sup>33-35</sup> Consequently around five billion pounds paid by the NHS to the private health care sector has remained essentially unaudited. The HSC recommended the National Audit Office (NAO) to carry out an investigation into ISTCs, and whether they increased productivity in the NHS; no such investigation has been undertaken by the NAO.<sup>30,36</sup> Most privately provided NHS funded primary hip replacements in England, Wales and Northern Ireland however are actually delivered by non-ISTC private hospitals according to the National Joint Registry, 19.6% in

2014 compared to 3.6% in ISTCs.<sup>37</sup> Neither has there been any scrutiny of the larger program of NHS funded patients treated privately outside of the ISTC program.

NHS England provided the blueprint for the Scottish Regional Treatment Centre, Scotland's only ISTC.<sup>38</sup> England's health secretary John Reid made "evangelical" trips to Scotland to extoll the virtues of the private sector when the Scottish executive were engaged in discussions with private healthcare companies including Alliance Medical, Capio Healthcare (now part of Ramsey Health Care), Care UK, Nations Healthcare Ltd (now part of Circle), UK Specialist Hospitals (now part of Care UK) and Netcare, some of main players in wave one of the English ISTC programme.<sup>7 39</sup> In Scotland, Netcare operated a similar contract regime to that in England with the referring NHS Boards (mainly Fife, Grampian and Tayside) guaranteeing payment for each patient referred (whether treated or not) to at least 90% of the agreed minimum referral value of the contract; this "Take or Pay" figure was 100% in English ISTCs.<sup>38</sup> Overpayment to ISTC providers has been found in England and Scotland.<sup>12 32</sup> It is not known how contracts with non-ISTC private providers operate.

## 2. Inequality

The impact of ISTC private sector provision of NHS funded treatments on inequality in England shows a bias towards patients from less deprived areas but no clear evidence of any sex or age bias.<sup>40-42</sup> The exclusion criterion for English ISTCs of "lack of necessary social support, e.g. no carer /escort available at discharge", the main predictor of delay in discharge, may work against older people and those with higher levels of deprivation who typically have longer lengths of stay in hospital following surgery.<sup>8 43 44</sup> There are no substantial differences in the medical exclusion criteria used by the Scottish ISTC to those practised in the NHS.<sup>10 45</sup> Additionally, patients in receipt of directly provided NHS hip replacements have worse symptoms, more comorbidities and poorer outcomes than ISTC patients.<sup>41 42</sup>

### What this study adds

Research from England has shown people living in the most deprived areas receive 70% fewer hip replacements than needed and those aged 85 and over 30% less.<sup>17</sup> The findings of increasing inequalities in relation to age and deprivation in Scotland warrant further investigation including the effects of reductions in territorial NHS Board direct and in-area provision, use of the private sector and use of the GJNH as an alternative to local hospital treatment. The patterns of inequality by socio-economic deprivation for territorial NHS Boards and the GJNH are similar to those found for

publicly funded hip replacements in England and also in Denmark and Spain; however the private sector in Scotland appears to treat a disproportionately high number of NHS funded patients from the least deprived quintiles of the population. <sup>22</sup>

#### Limitations of the study

The destination of a patient will depend not only on their individual choice of provider but also on the range of choices made available to them, normally by their GP, and whether the patient is accepted or rejected by the provider chosen. It would be extremely helpful to understand these mechanisms both quantitatively and qualitatively and their role in influencing inequality.

NHS funded patients treated outside of Scotland are not included in this study.

#### *Conclusion*

Patient choice and use of private sector in Scotland was associated with a decrease in direct and in-area NHS provision and may have contributed to an increase in age related and socio-economic inequalities. By 2012/13 territorial NHS Boards had not recovered 2006/07 levels of provision; this was most marked for four NHS Boards, three of which had the greatest use of the private sector, namely Fife, Grampian and Lothian. The expansion of the GJNH did provide additional overall capacity and may have lessened socio-economic inequalities, however it may have increased age related inequalities in treatment as the GJNH attracts younger patients.

Equality impact assessments should consider the role of the private sector in increasing inequalities by age and deprivation and on locally sustainable solutions. Reductions in waiting times and waiting time targets are blunt instruments for understanding the effect of using the private sector on public provision and overall capacity.

#### Acknowledgements

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## References

- 1 Department of Health. The NHS Plan: a plan for investment, a plan for reform. [webarchive.nationalarchives.gov.uk/20130502102046/http://www.connectingforhealth.nhs.uk/resources/policyandguidance/nhs\\_plan.pdf](http://webarchive.nationalarchives.gov.uk/20130502102046/http://www.connectingforhealth.nhs.uk/resources/policyandguidance/nhs_plan.pdf) (03 May 2016, date last accessed).
- 2 Audit Scotland. Management of Patients on NHS Waiting Lists, 2013. [www.audit-scotland.gov.uk/docs/health/2013/nr\\_130221\\_nhs\\_waiting\\_lists.pdf](http://www.audit-scotland.gov.uk/docs/health/2013/nr_130221_nhs_waiting_lists.pdf) (03 May 2016, date last accessed).
- 3 The Scottish Government. Patient Rights (Scotland) Act 2011. [www.legislation.gov.uk/asp/2011/5/contents](http://www.legislation.gov.uk/asp/2011/5/contents) (03 May 2016, date last accessed).
- 4 The Scottish Government. Patient Rights (Scotland) Act 2011 - Treatment Time Guarantee Guidance 2012. [www.sehd.scot.nhs.uk/mels/CEL2012\\_32.pdf](http://www.sehd.scot.nhs.uk/mels/CEL2012_32.pdf) (03 May 2016, date last accessed).
- 5 Intuition Communication Ltd. Your rights to treatment in Europe. A UK patient's guide to the European Directive on Cross Border Healthcare. 2011. [www.networks.nhs.uk/nhs-networks/cross-border-healthcare-network/documents/EU%20Treatment%20Guide.pdf/view](http://www.networks.nhs.uk/nhs-networks/cross-border-healthcare-network/documents/EU%20Treatment%20Guide.pdf/view) (03 May 2016, date last accessed).
- 6 The Scottish Parliament. Question S2W-17002: John Swinney, North Tayside, Scottish National Party, Date Lodged: 31/05/2005. Answered by Andy Kerr 20/06/2005.
- 7 The Scottish Parliament. Question S2W-16967: Carolyn Leckie, Central Scotland, Scottish Socialist Party, Date Lodged: 31/05/2005. Answered by Andy Kerr 14/06/2005.
- 8 Mason AM, Siciliani, L, Sivey, P, Street, A. Establishing a fair playing field for payment by results. CHE research paper 39. Centre for Health Economics: University of York, 2008. [www.york.ac.uk/inst/che/pdf/rp39.pdf](http://www.york.ac.uk/inst/che/pdf/rp39.pdf) (03 May 2016, date last accessed).
- 9 Macdonald R, Evans J. The Scottish Regional Treatment Centre (SRTC) Pilot Project at Stracathro Hospital by Brechin, Angus. 2008.
- 10 Brodies LLP. Scottish Regional Treatment Centre - Stracathro. Contract documents. 2006.
- 11 Audit Scotland. Review of Orthopaedic Services, 2010. [www.audit-scotland.gov.uk/docs/health/2010/nr\\_100325\\_orthopaedic\\_services.pdf](http://www.audit-scotland.gov.uk/docs/health/2010/nr_100325_orthopaedic_services.pdf) (03 May 2016, date last accessed).
- 12 Pollock AM, Kirkwood G. Independent sector treatment centres: learning from a Scottish case study. *BMJ* 2009;338:b1421.

- 13 The Scottish Government. A Stronger Scotland. The Government's Programme For Scotland 2015-16. [www.gov.scot/Resource/0048/00484439.pdf](http://www.gov.scot/Resource/0048/00484439.pdf) (03 May 2016, date last accessed).
- 14 Philip A. Almost £100m of public money used to treat patients outside NHS despite Alex Salmond vowing to 'eradicate' private sector in Scotland. Daily Record. 20 August 2014.
- 15 UK Government. Equality Act 2010. [www.legislation.gov.uk/ukpga/2010/15/contents](http://www.legislation.gov.uk/ukpga/2010/15/contents) (03 May 2016, date last accessed).
- 16 NHS Health Scotland. Equality Act 2010. Updated November 2015. [www.healthscotland.com/equalities/equalityact.aspx#duties](http://www.healthscotland.com/equalities/equalityact.aspx#duties) (03 May 2016, date last accessed).
- 17 Judge A, Welton NJ, Sandhu J, Ben-Shlomo Y. Equity in access to total joint replacement of the hip and knee in England: cross sectional study. *BMJ* 2010;341:c4092.
- 18 Steel N, Melzer D, Gardener E, McWilliams B. Need for and receipt of hip and knee replacement--a national population survey. *Rheumatology (Oxford)* 2006;45:1437-41.
- 19 Fitzpatrick R, Norquist JM, Reeves BC, Morris RW, Murray DW, Gregg PJ. Equity and need when waiting for total hip replacement surgery. *Journal of evaluation in clinical practice* 2004;10:3-9.
- 20 Cookson R, Dusheiko M, Hardman G. Socioeconomic inequality in small area use of elective total hip replacement in the English National Health Service in 1991 and 2001. *Journal of health services research & policy* 2007;12 Suppl 1:S1-10-7.
- 21 Dixon T, Shaw M, Ebrahim S, Dieppe P. Trends in hip and knee joint replacement: socioeconomic inequalities and projections of need. *Annals of the rheumatic diseases* 2004;63:825-30.
- 22 Cookson R, Gutacker N, Garcia-Armesto S, Angulo-Pueyo E, Christiansen T, Bloor K, et al. Socioeconomic inequality in hip replacement in four European countries from 2002 to 2009--area-level analysis of hospital data. *European journal of public health* 2015;25 Suppl 1:21-7.
- 23 Milner PC, Payne JN, Stanfield RC, Lewis PA, Jennison C, Saul C. Inequalities in accessing hip joint replacement for people in need. *European journal of public health* 2004;14:58-62.
- 24 Chaturvedi N, Ben-Shlomo Y. From the surgery to the surgeon: does deprivation influence consultation and operation rates? *British Journal of General Practice* 1995;45:127-31.
- 25 Scottish Arthroplasty Project. Annual Report 2010. [www.arthro.scot.nhs.uk/Reports/Main.html](http://www.arthro.scot.nhs.uk/Reports/Main.html) (03 May 2016, date last accessed).
- 26 Cookson R, Laudicella M. Effects of Health Reform on Health Care Inequalities. Revised Final Report to the NIHR SDO Programme and the DH Health Reform Evaluation Programme: University of York 2011.
- 27 Information Services Division NHS Scotland. Summary of OPCS codes used by Scottish Arthroplasty Project. [www.arthro.scot.nhs.uk/OPCS\\_codes\\_summary\\_150710.pdf](http://www.arthro.scot.nhs.uk/OPCS_codes_summary_150710.pdf) (03 May 2016, date last accessed).

- 28 Office for National Statistics. Revised European Standard Population 2013 (2013 ESP). Age-standardised mortality rate calculation template using the 2013 ESP. [www.ons.gov.uk/ons/guide-method/user-guidance/health-and-life-events/revised-european-standard-population-2013--2013-esp-/index.html](http://www.ons.gov.uk/ons/guide-method/user-guidance/health-and-life-events/revised-european-standard-population-2013--2013-esp-/index.html) (03 May 2016, date last accessed).
- 29 Office for National Statistics. United Kingdom Health Statistics 2010 - Chapter 6: Use of services. [www.ons.gov.uk/ons/rel/ukhs/united-kingdom-health-statistics/2010/index.html](http://www.ons.gov.uk/ons/rel/ukhs/united-kingdom-health-statistics/2010/index.html) (03 May 2016, date last accessed).
- 30 House of Commons Health Committee. Fourth Report of Session 2005–06 . Independent Sector Treatment Centres. Conclusions and recommendations. London. 2006. [www.publications.parliament.uk/pa/cm200506/cmselect/cmhealth/934/93410.htm](http://www.publications.parliament.uk/pa/cm200506/cmselect/cmhealth/934/93410.htm) (03 May 2016, date last accessed).
- 31 House of Commons Health Committee. Fourth Report of Session 2005–06 . Independent Sector Treatment Centres. Evidence submitted by the Royal College of Surgeons of England (ISTC 39). London. 2006. [www.publications.parliament.uk/pa/cm200506/cmselect/cmhealth/934/934we41.htm](http://www.publications.parliament.uk/pa/cm200506/cmselect/cmhealth/934/934we41.htm) (03 May 2016, date last accessed).
- 32 Moore A. £252m underactivity bill sparks renewed calls for contract renegotiations. Health Service Journal. 2011. [www.hsj.co.uk/news/finance/252m-underactivity-bill-sparks-renewed-calls-for-contract-renegotiations/5027427.article#.Vdc4kpdZJuU](http://www.hsj.co.uk/news/finance/252m-underactivity-bill-sparks-renewed-calls-for-contract-renegotiations/5027427.article#.Vdc4kpdZJuU) (03 May 2016, date last accessed).
- 33 House of Commons Health Committee. Independent Sector Treatment Centres. Fourth report of session 2005-06. Volume 1. London. 2006. [www.publications.parliament.uk/pa/cm200506/cmselect/cmhealth/934/934i.pdf](http://www.publications.parliament.uk/pa/cm200506/cmselect/cmhealth/934/934i.pdf) (03 May 2016, date last accessed).
- 34 House of Commons Health Committee. Fourth Report of Session 2005–06 . Independent Sector Treatment Centres. Written Evidence. Further supplementary memorandum submitted by the Department of Health (ISTC 1E). 2006. [www.publications.parliament.uk/pa/cm200506/cmselect/cmhealth/934/934awe09.htm](http://www.publications.parliament.uk/pa/cm200506/cmselect/cmhealth/934/934awe09.htm) (03 May 2016, date last accessed).
- 35 Information Commissioners Office. What is the Freedom of Information Act? [ico.org.uk/for-organisations/guide-to-freedom-of-information/what-is-the-foi-act/](http://ico.org.uk/for-organisations/guide-to-freedom-of-information/what-is-the-foi-act/) (03 May 2016, date last accessed).
- 36 Naylor C, Gregory S. Briefing. Independent sector treatment centres: The Kings Fund. 2009. [www.kingsfund.org.uk/sites/files/kf/field/field\\_publication\\_file/briefing-independent-sector-treatment-centres-istc-chris-naylor-sarah-gregory-kings-fund-october-2009.pdf](http://www.kingsfund.org.uk/sites/files/kf/field/field_publication_file/briefing-independent-sector-treatment-centres-istc-chris-naylor-sarah-gregory-kings-fund-october-2009.pdf) (03 May 2016, date last accessed).
- 37 National Joint Registry for England and Wales. Hips - All Procedures - Activity. Procedure details by type of provider. 2014. [www.njrreports.org.uk/hips-all-procedures-activity](http://www.njrreports.org.uk/hips-all-procedures-activity) (03 May 2016, date last accessed).

- 38 Department of Health. ISTC Wave 1 Manual. 2006. [webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4128133](http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4128133) (03 May 2016, date last accessed).
- 39 Wishart R. Prognosis looks poor for ailing private plan. *The Herald* 07 November 2006.
- 40 Healthcare Commission. Independent sector treatment centres. A review of the quality of care. 2007. [archive.cqc.org.uk/\\_db/\\_documents/ISTC\\_Final\\_Tagged\\_200903243502.pdf](http://archive.cqc.org.uk/_db/_documents/ISTC_Final_Tagged_200903243502.pdf) (03 May 2016, date last accessed).
- 41 Chard J, Kuczawski M, Black N, van der Meulen J. Outcomes of elective surgery undertaken in independent sector treatment centres and NHS providers in England: audit of patient outcomes in surgery. *BMJ* 2011;343:d6404.
- 42 Mason A, Street A, Verzulli R. Private sector treatment centres are treating less complex patients than the NHS. *Journal of the Royal Society of Medicine* 2010;103:322-31.
- 43 Faiz O, Haji A, Burns E, Bottle A, Kennedy R, Aylin P. Hospital stay amongst patients undergoing major elective colorectal surgery: predicting prolonged stay and readmissions in NHS hospitals. *Colorectal disease : the official journal of the Association of Coloproctology of Great Britain and Ireland* 2011;13:816-22.
- 44 Cookson R, Laudicella M. Do the poor cost much more? The relationship between small area income deprivation and length of stay for elective hip replacement in the English NHS from 2001 to 2008. *Social Science and Medicine*. 2011;72:173-84.
- 45 NHS Tayside. Standard Business Case. Future Service Model. Scottish Regional Treatment Centre at Stracathro. 2009. [www.nhstaysidecdn.scot.nhs.uk/NHSTaysideWeb/idcplg?IdcService=GET\\_SECURE\\_FILE&dDocName=DOCS\\_041480&Rendition=web&RevisionSelectionMethod=LatestReleased&noSaveAs=1](http://www.nhstaysidecdn.scot.nhs.uk/NHSTaysideWeb/idcplg?IdcService=GET_SECURE_FILE&dDocName=DOCS_041480&Rendition=web&RevisionSelectionMethod=LatestReleased&noSaveAs=1) (03 May 2016, date last accessed).