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The Economics of Healthcare

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Institute for Fiscal Studies

November 2014

Healthcare and Economics

This lecture will consider:

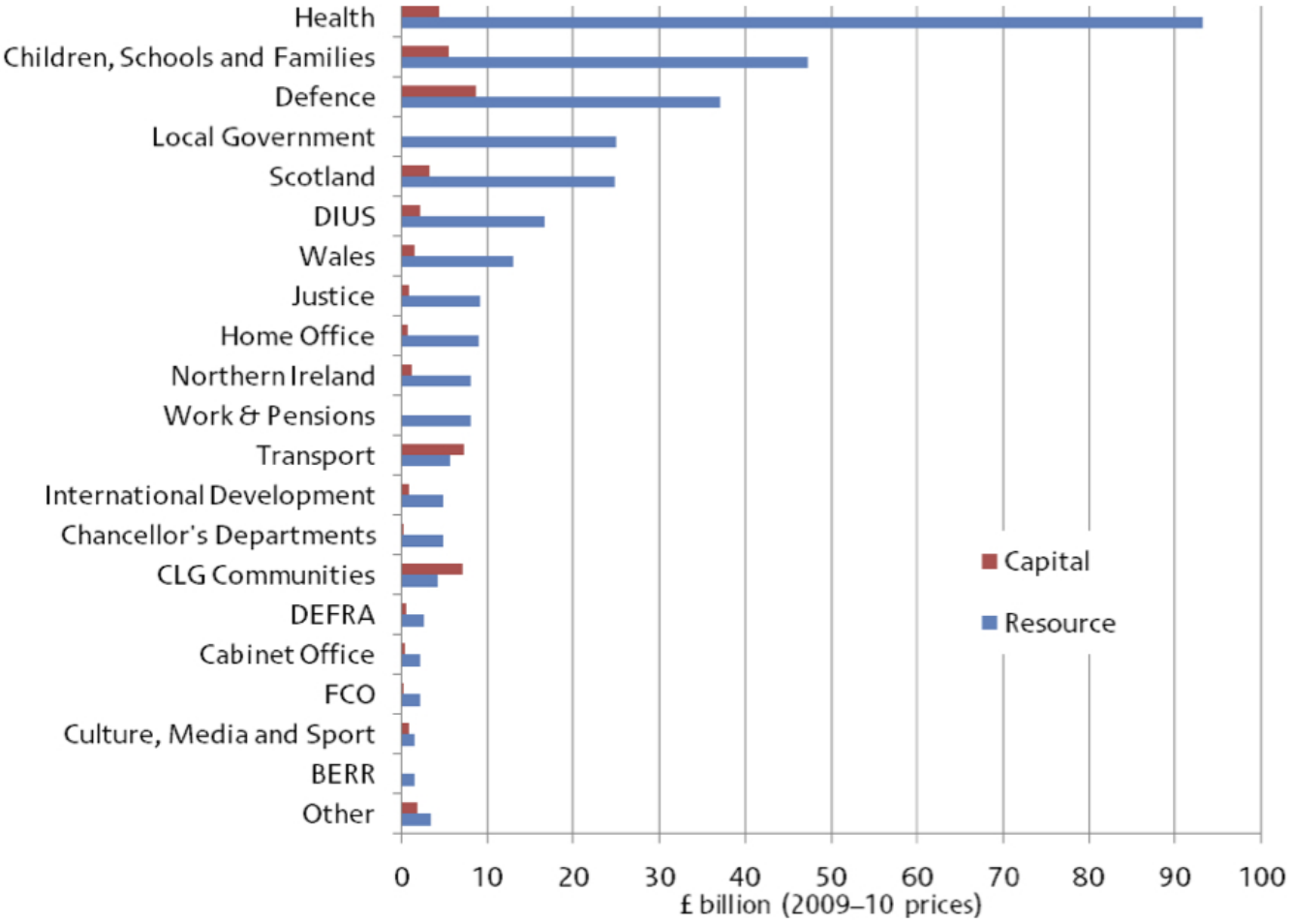
1. Why you as economists should care about healthcare.
2. How the provision of healthcare differs across countries.
3. Major developments in the economics of healthcare since 1990.

1. Health is valued very highly

- Estimates for the value of a quality adjusted life year (QALY) range from £20,000 to several hundred thousand pounds
- Politically contentious (to say the least)
- Health is an input or component of human capital
- Important when studying individual or social welfare

2. Healthcare is Expensive

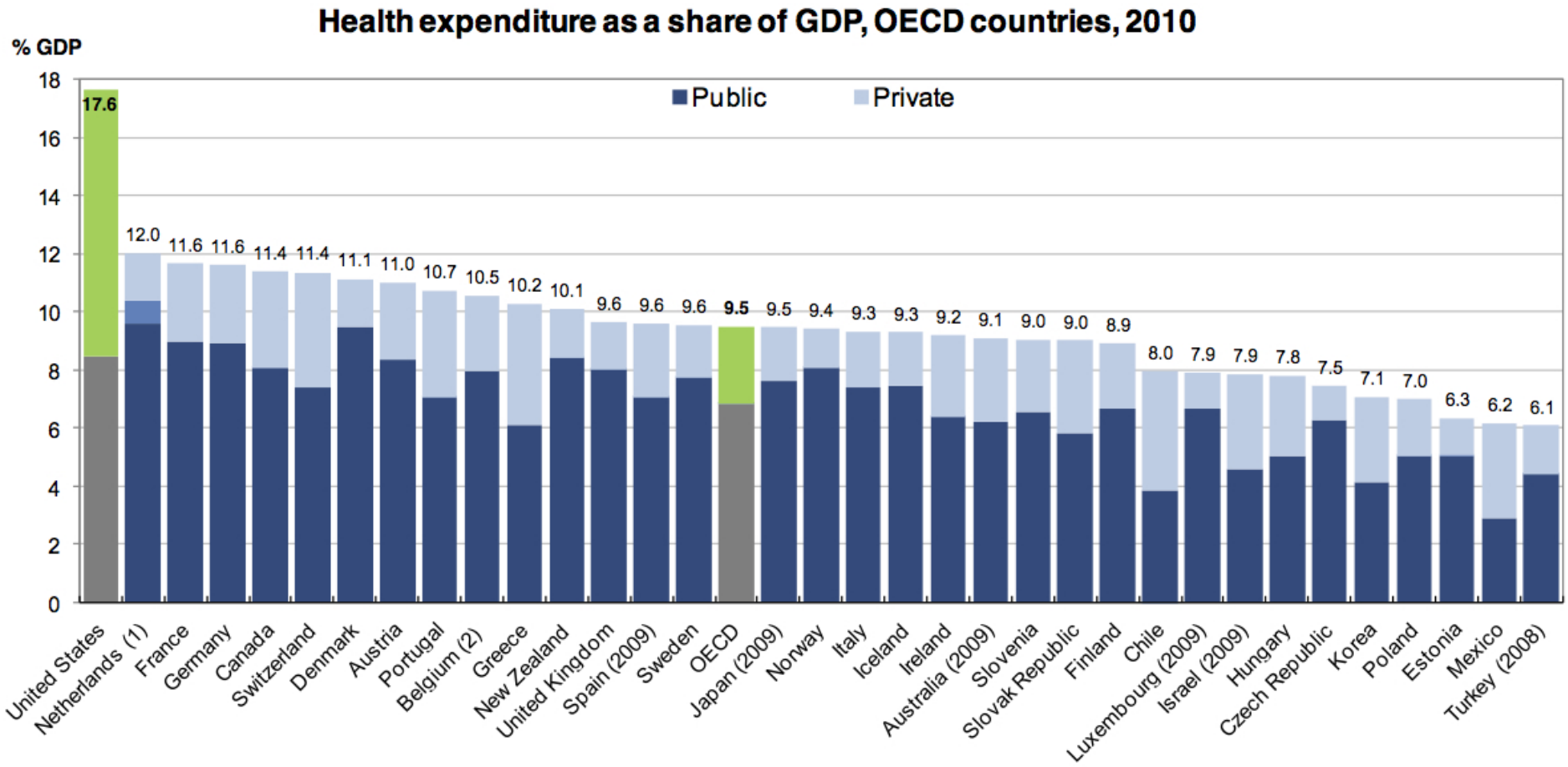
Figure : Departmental expenditure limits for each department, 2008–09



Source: HM Treasury, Public Expenditure Outturn Update, July 2009

(http://www.hm-treasury.gov.uk/d/press_66_09.pdf).

2. Healthcare is Expensive



Source: OECD Health Data (2012) - How does the United States Compare

http://www.oecd.org/unitedstates/BriefingNoteUSA2012.pdf

3. It's complicated!

- There are a number of reasons why we need to think especially carefully about how to provide medical care
- Kenneth Arrow wrote the seminal paper on this topic in 1963
  - 'Uncertainty and the Welfare Economics of Medical Care' (*American Economic Review*)
- Arrow (1963) highlights a number of reasons why we might not want to leave the provision of medical care to the market
  - Adverse Selection (problems in correctly pricing risk)
  - Moral Hazard (incentives to seek excess treatment under full insurance)
  - A range of other features of the health care industry that do not belong to the standard competitive equilibrium model

Healthcare - a competitive market?

Factors that improve market efficiency

1. A large number of buyers and sellers

Healthcare - a competitive market?

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2. Free entry and exit

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3. Full information

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4. Private costs = social costs

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International differences

- We have already seen that there is a great deal of variation in the amount spent on healthcare in different countries
  - Overall spending
  - % of spending which is public
- The way in which healthcare is provided also varies drastically
- We will focus on three different types of systems
  - Beveridge
  - Bismarck
  - USA (hard to classify!)

Beveridge systems

- Countries such as the UK, Australia, Canada and Sweden have 'Beveridge' systems
- Universal insurer (a single payer)
  - In the UK case this is the NHS
- Healthcare is mostly provided by the public sector
  - Public hospitals and public sector workers
- Importantly: healthcare is free at the point of use
  - No insurance premiums, fees etc
  - Rationing occurs based on 'need' rather than ability to pay

Bismarck systems

- Countries such as Germany and France have a different type of healthcare system
- Universal insurance is provided through two channels:
  - Employer sponsored plans
  - Government (for unemployed etc)
- Individuals pay mandatory insurance premiums
  - Often through payroll taxes
  - Premiums are 'community-rated', so are independent of medical risk
- Providers of healthcare are private
  - Private hospital, privately employed staff
  - Prices are heavily regulated by the government

USA - a combination of systems

- The US is difficult to categorise into one of these systems.
- Some healthcare is funded publicly:
  - Medicaid (low income)
  - Medicare (elderly)
- For everyone else:
  - Employer-provided insurance
  - Privately-purchased insurance
  - Remain uninsured
- There are a range of different types of insurance provided
  - A whole strand of the economic literature is dedicated to examining the benefits of each type of insurance plan!

International comparisons

- Beveridge systems have a single (public) insurer, compared to multiple insurers under the Bismarck system
- Beveridge systems are mainly served by public providers
  - Less choice of provider than in Bismarck system
  - Bismarck system relies on the existence of prices
- Greater role for the GP in Beveridge systems
  - Gatekeepers / ration services according to needs
- Countries with Beveridge systems typically spend less on healthcare (and it is not clear that they get worse outcomes!)
- The US presents a complex mix of these systems, and has two causes for concern:
  - Large costs (inspired reforms such as 'Obamacare')
  - Potential for parts of the population to remain uncovered by insurance

Features of UK healthcare policy since 1990

1. Purchaser-provider split
2. Competition over price vs quality
3. Patient choice
4. New entrants

Purchaser/Provider Split

- Reforms in 1991 created an "internal market" within the NHS
- The market was created by separating the roles of financing and supplying (secondary) healthcare services
- **Providers** - provide healthcare (supply)
- **Purchasers/Commissioners** - (demand)

Providers

- Hospitals or groups of hospitals are known as Acute Trusts - supply secondary healthcare
- Most are now "Foundation Trusts" - more autonomy

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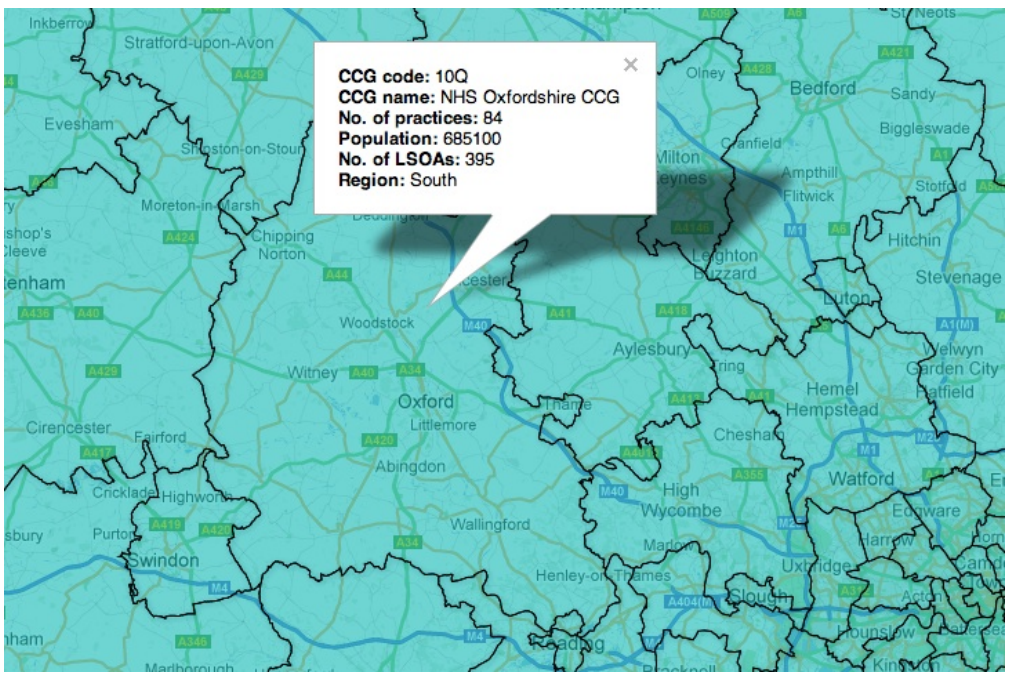
Commissioners

- Allocated money from general taxation to purchase healthcare for their population
- Names change regularly: District Health Authority & GP Fundholders $\Longrightarrow$Primary Care Trusts (PCTs) $\Longrightarrow$Enlarged PCTs $\Longrightarrow$Clinical Commissioning Groups (CCGs) $\Longrightarrow$?



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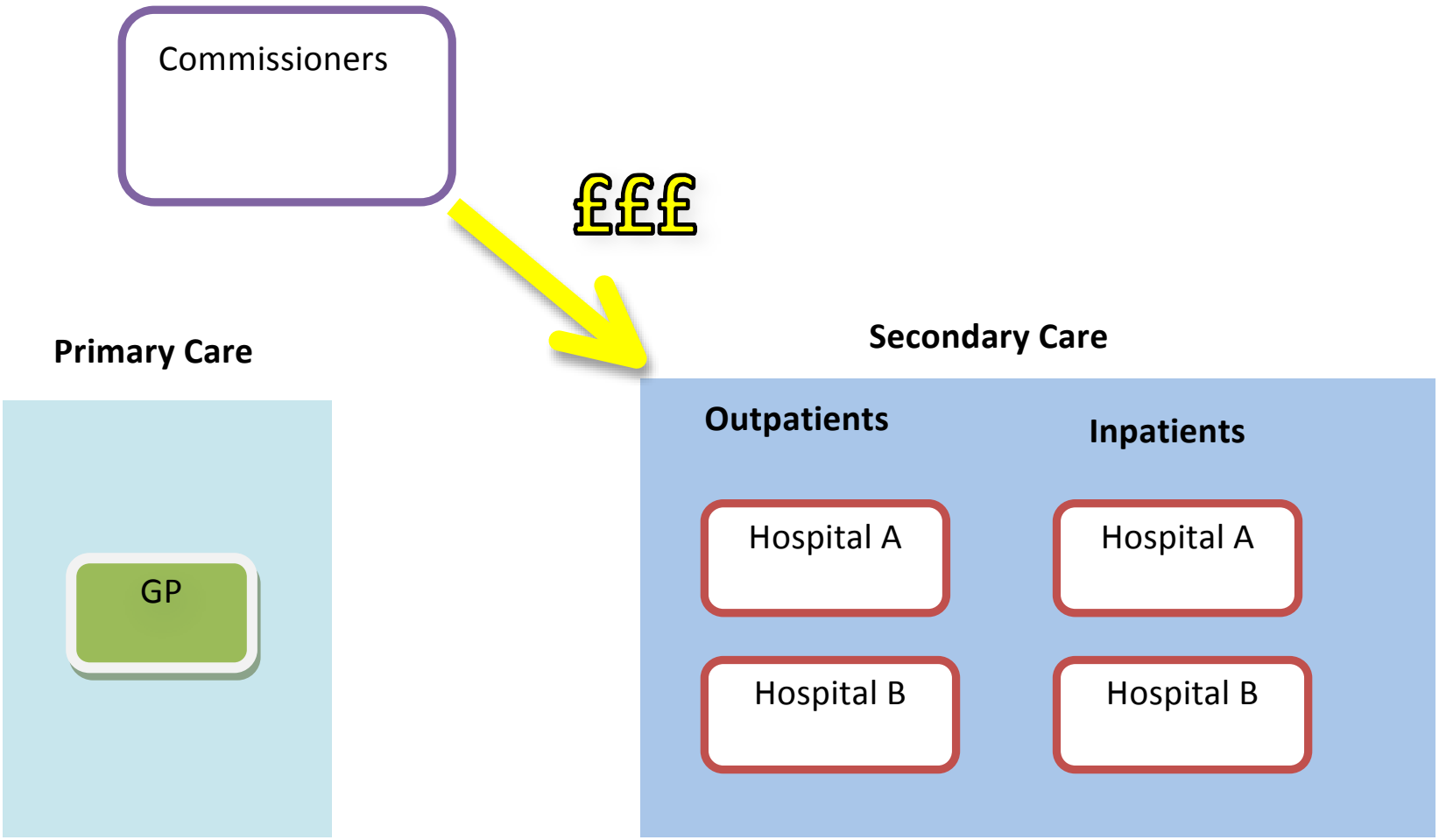
Stylised structure of the NHS



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Price vs Quality Competition

- In most markets consumers observe price and quality, and firms compete on both
- In healthcare, quality may be poorly observed
- When costs are constant in quantity, but increasing in quality, the equilibrium quality is given by the Dorfman-Steiner condition (Gaynor, 2006):

$$Quality = \frac{p}{d} \cdot \frac{\varepsilon_z}{\varepsilon_p}$$

- where p is the price paid to the hospital, d is the marginal cost of quality, ε_p and ε_z are the elasticities of demand with respect to price and quality

Dorfman-Steiner Implications

$$Quality = \frac{p}{d} \cdot \frac{\varepsilon_z}{\varepsilon_p}$$

Implications

- The amount spent on quality relative to sales should increase if ε_z increases relative to ε_p
- A rise in competition should lead to $\Uparrow\varepsilon_p$ and $\Downarrow p$. Unless $\Uparrow\varepsilon_z$ quality will fall
- If consumers have better information about price than quality, it is likely that quality will fall
- When prices are regulated and fixed, firms compete for consumers on non-price dimensions. If price is set above MC at some baseline quality, firms will increase quality to try and gain market share
- Equilibrium quality is then increasing in the number of firms in the market, and in the regulated price

Competition in the Internal market

- Under the internal market (1991-1997), purchasers could negotiate with providers on the basis of price and quality
  - **Price** - lower prices meant that purchasers could afford to buy more elective care
  - **Quality** - measures of hospital quality were not publically available. Information was instead based on word of mouth and local reputation
- Purchasers therefore had a much stronger incentive to negotiate on prices than on quality
- Providers were not allowed to carry forward surpluses or deficits to future years

Hospital quality and the internal market

- Propper et al. (2008) consider the impact of the internal market on hospital quality
- Quality outcomes: waiting lists, 30 day mortality rate from Acute Myocardial Infaction (AMI) or heart attacks (emergency)
- Effects are identified by exploiting geographical differences in potential competition between hospitals (difference in difference)

$$m_{jt} = \alpha + \beta[I(PolicyOn)_t \times Comp_j] + \gamma_t + \mu_j + \delta X_{jt} + \varepsilon_{mj}$$

- where m_{jt} is hospital level quality (e.g, death rates); $I(PolicyOn)_t$ is an indicator for the internal market period; $Comp_j$ is a measure of the extent of competition; γ_t and μ_j are time and hospital dummies; X_{jt} are time varying hospital characteristics; and ε_{mj} is the error term. Coefficient of interest $= \beta$
- Data from 1991 to 1999. Competition possible 1992-1997

Hospital quality and the internal market - results

- **Hospital quality**
  - Waiting lists fell (observable to purchasers)
  - Death rates from heart attacks increased (not published until 1999)
  - Trusts could not save or borrow - any deficits had to be met through cost savings
- **Strategic planning**
  - Most contracts between purchasers and hospitals were very short term (<1 year), making long-term strategic planning difficult
- **Knowledge exchange**
  - British Medical Association expressed concerns that competition limited the diffusion of knowledge about medical breakthroughs.

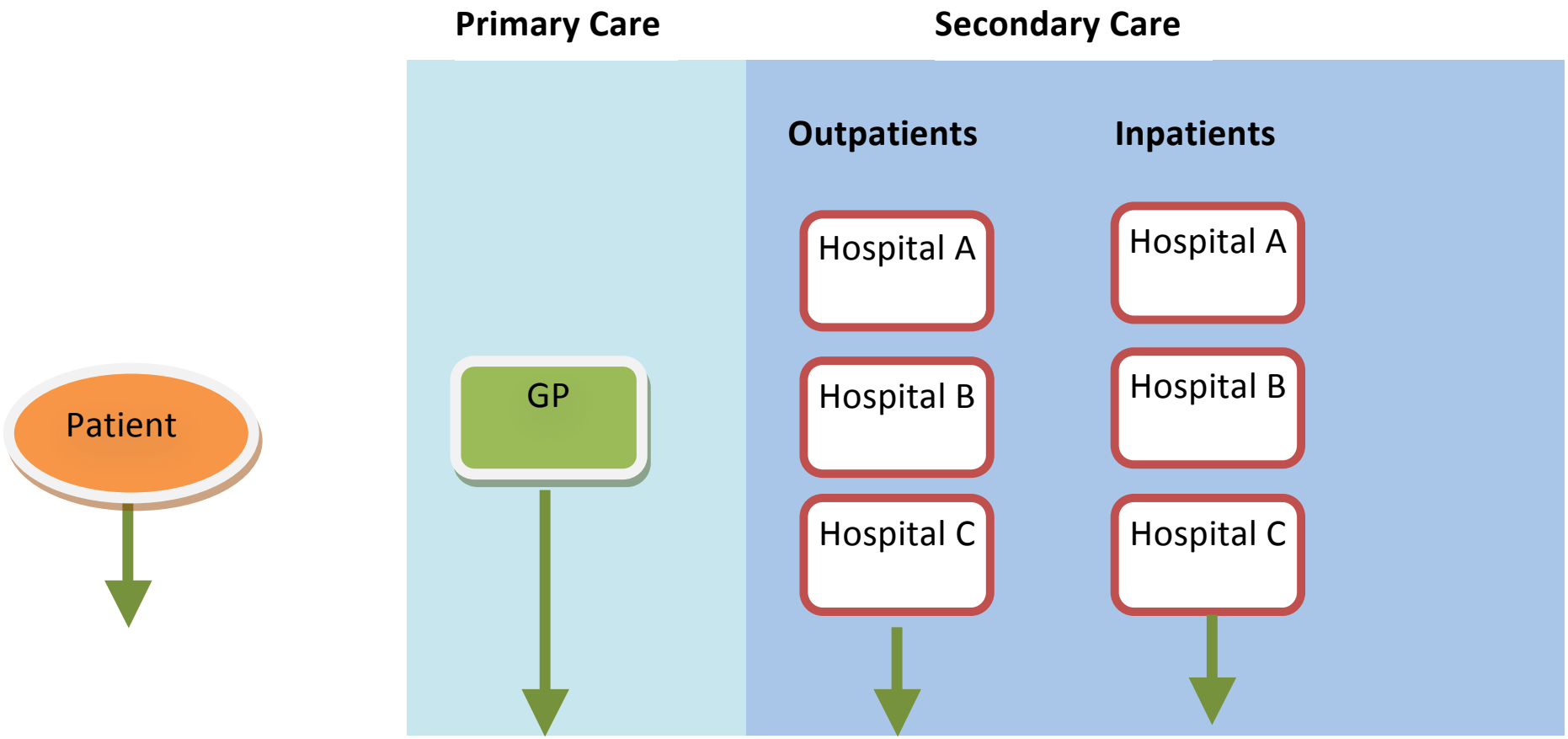
Lessons

- Competition on the basis of price has an ambiguous effect on quality
- Quality measures should be publically available
- Some regulation is needed to ensure that best practices are followed

Why Choice?

- First introduced in 2006
- Motivations for giving patients choice:
  - Patients intrinsically value the option to choose
  - Choice provides a quasi-market mechanism for directing resources towards higher quality healthcare providers
- Requirements for choice to increase quality (Burgess et al., 2005):
  - Financial consequences for providers of declines in patient numbers
  - Spare capacity in the system

What choice?



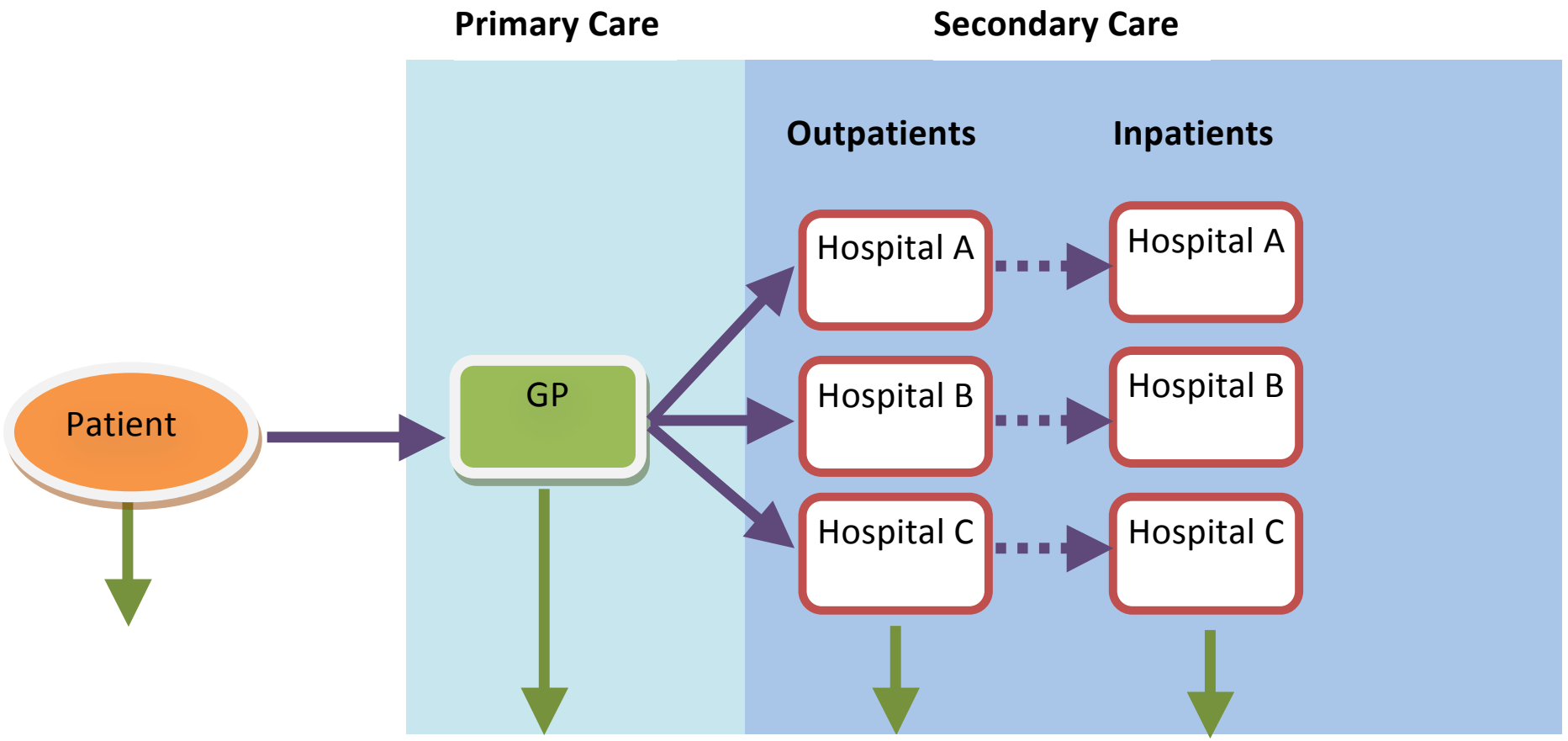
Patients decide not to visit the doctor

Patients receive treatment within primary care

Patients receive outpatient treatment or discharged without treatment

Patients are admitted to hospital and discharged after treatment

What choice?



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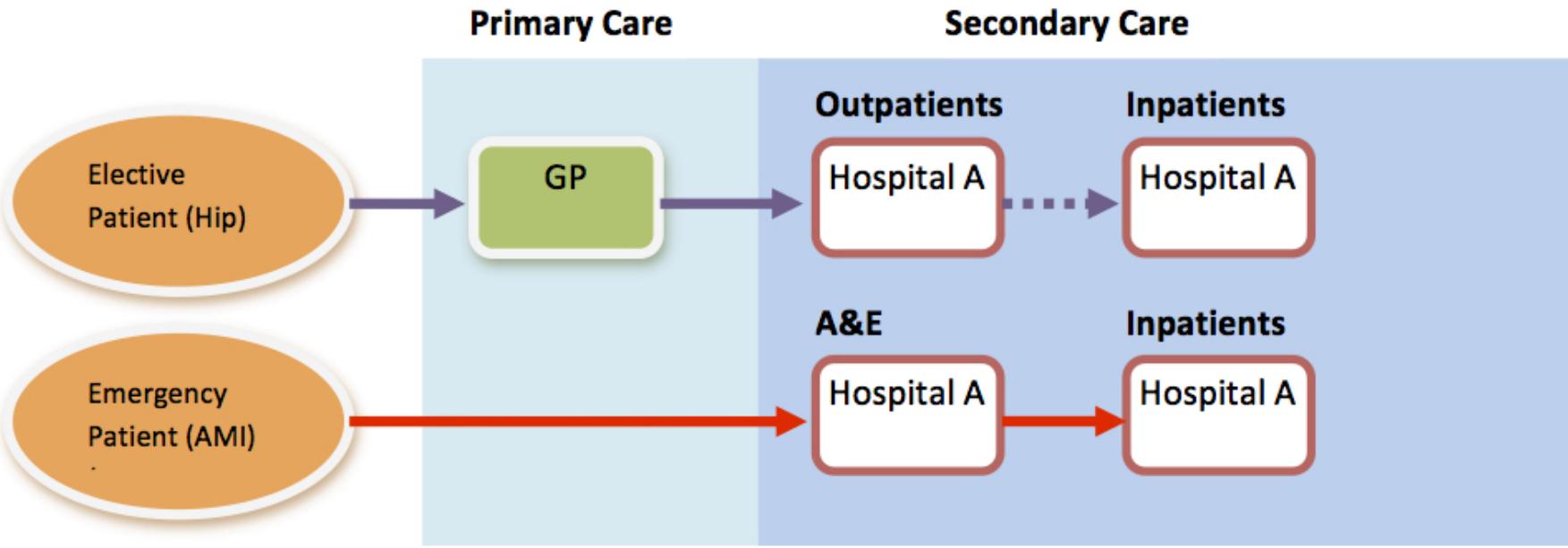
Institutional Setting

- **Money follows patients** - Hospitals paid per patient and procedure ("Payments by Results")
- **Competition on the basis of quality** - payments to hospital fixed by procedure group
- **Greater Hospital Autonomy** - NHS hospitals could apply to become Foundation Trusts - giving greater fiscal, clinical and managerial autonomy. This included the ability to borrow and reinvest surpluses across years.

Impact of Choice

- The choice policy was introduced nationwide, providing no natural control group
- Attempts to identify the impact of choice have used variation in potential competition between hospitals
- Principal measure of quality = 30 day mortality rate from heart attacks
- Cooper et al. (2011) - Higher competition (number/concentration of providers) associated with a faster decrease in 30 day mortality rate for heart attacks after 2006
- Gaynor et al. (2010) - **"Death by Market Power"**- NHS reforms resulted in significant improvements in mortality and reductions in length-of-stay without changes in total expenditure or increases in expenditure per patient

Figure : Patient choice and measurement of hospital quality



Unanswered Questions

1. Are all patients offered a choice?
2. What are the relative roles of GPs and patients in making choices?
3. Through what mechanisms does choice of a first outpatient appointment affect the quality of emergency hospital care?

Introducing private providers

- Ad hoc purchasing from the private sector has existed for years
- Private sector provision of NHS-funded secondary care was formalised in 2003 with the launch of Independent Sector Providers
- There are two types of ISPs
  - Independent Sector Treatment Centres (ISTCs)
  - Any Qualified Providers (AQPs)

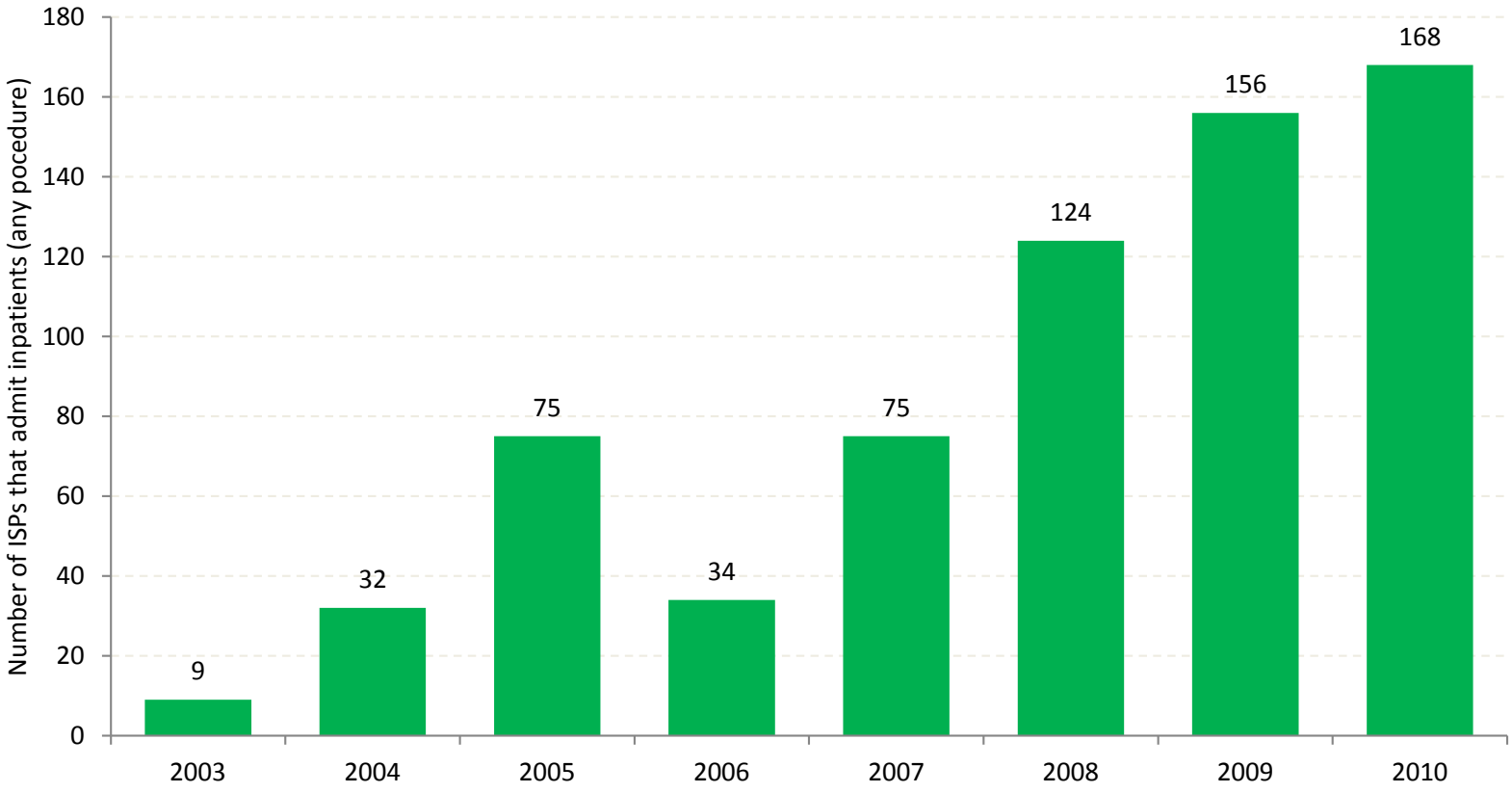
Independent Sector Providers

- Independent Sector Treatment Centres (ISTCs) are privately owned, but under contract to provide planned diagnostic tests and operations to NHS patients (Naylor & Gregory, 2009)
- Wave 1 ISTC objectives (2003-6)
  - To reduce waiting times
- Wave 2 ISTCs objectives (2007-2010)
  - To increase competitive pressure on NHS providers to improve quality (including waiting times)
  - To provide more choice to patients
  - To "create a space for innovation"

Any Qualified Providers

- In mid 2007, the choice of providers in orthopaedics was expanded to cover existing facilities, such as private hospitals, through the Extended Choice Network
- AQPs treat both privately funded and NHS-funded patients (at the NHS tariff)
- Extended to other specialities when the second choice reform was introduced in 2008
- There are a greater number of AQPs in operation, but they treat fewer patients per site relative to ISTCs

Figure : The number of ISPs that admit inpatients, all procedures (2003 - 2010)

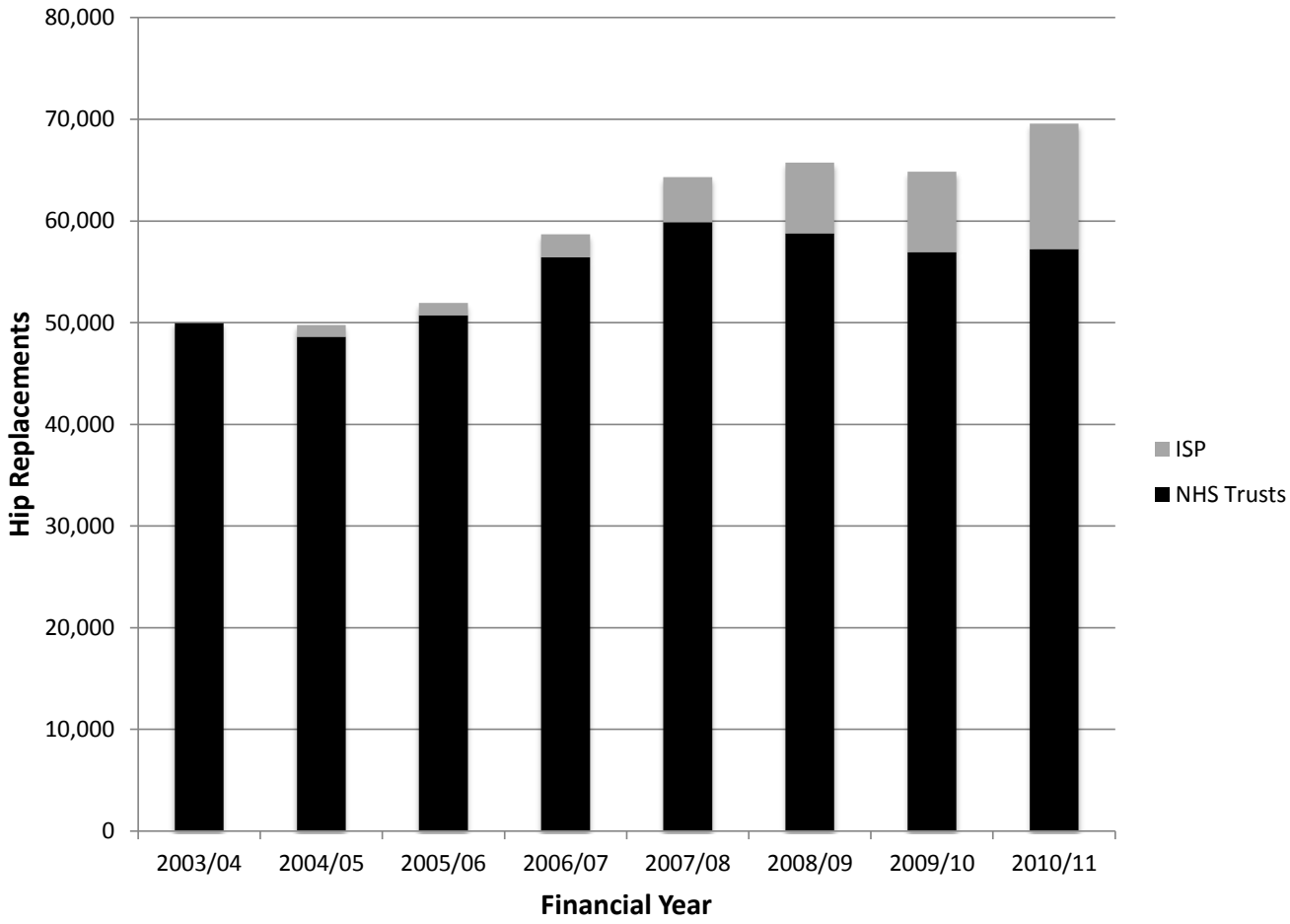


Source: Hospital Episodes Statistics.

What impact have ISPs had on NHS-funded volumes?

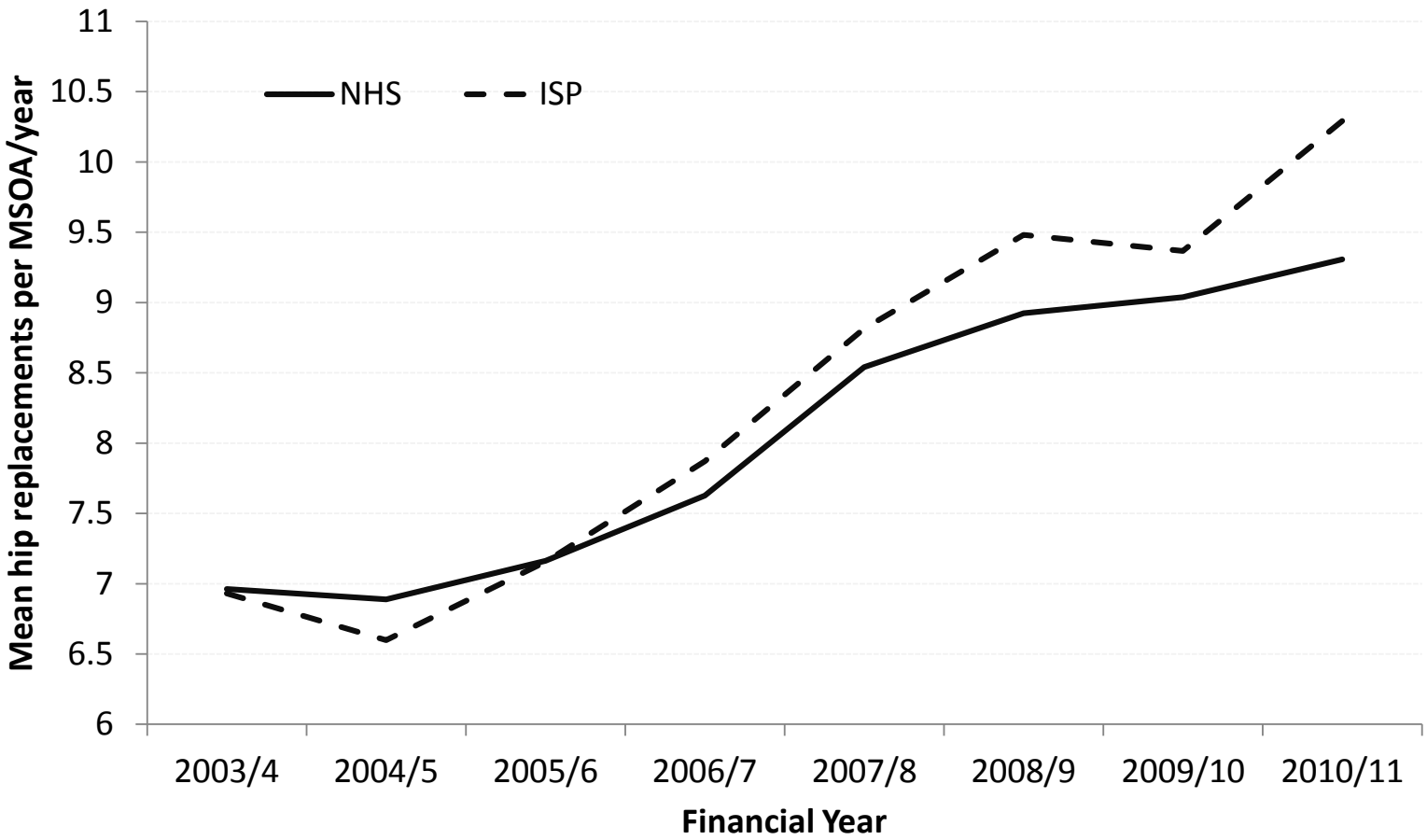
- ISPs accounted for 3.5% of NHS-funded first outpatient appointments in 2010/11 (Kelly & Tetlow, 2012)
  - However this is significantly greater for certain procedures.
- ISPs were initially introduced to reduce capacity constraints. Have they been successful?
- We will examine what has happened to NHS-funded hip replacements in areas where an ISP was introduced as the closest provider (compared to areas where an NHS trust remains the closest provider).

Figure : Total number of NHS-funded hip replacements in England, by provider type



- The total number of NHS-funded hip replacements increased by 40% between 2003/04 and 2010/11.
- After 2007/08, most of this growth is accounted for by ISPs.

Figure : Mean hip replacements per MSOA/year by nearest provider type in 2010/11



- Growth was fastest in areas where an ISP was located closer than the nearest NHS trust by 2010/11.

- Number of residents in MSOA m that receive a NHS-funded hip replacement (conducted by an NHS Trust or an ISP) in year t:

$$Hips_{mt} = \alpha + \beta ISP_{mt} + \gamma_m + \mu_t + X_{mt} + \varepsilon_{mt} \quad (1)$$

- The coefficient of interest is β, the effect of introducing an ISP close to MSOA m on number of residents admitted for NHS-funded hip replacements.
- X_{mt} includes time varying MSOA measures of population age composition, admissions for fractured neck of femur, and the unemployment rate. ε_{mt} clustered at the PCT level.
- Identifying assumption: conditional on X_{mt}, ISP_{mt} uncorrelated with ε_{mt}.
- Note: MSOAs are geographic/statistical constructs, with no administrative jurisdiction.

Table : Fixed effects estimates of the impact of ISP introduction on number of admittances for elective hip replacements per MSOA

Type of ISP Closer:	**ISP**	**ISTC**	**AQP**	**ISTC20**	**AQP20**
	(1)	(2)	(3)	(4)	(5)
ISP closer than nearest NHS Trust	0.536***	0.913**	0.405***	1.188***	0.825***
	(0.125)	(0.390)	(0.116)	(0.392)	(0.168)
Pop 65-79 (thousands)	9.709***	9.791***	9.789***	9.733***	9.579***
	(0.865)	(0.862)	(0.867)	(0.860)	(0.864)
Pop 80+ (thousands)	9.742***	9.814***	9.771***	9.817***	9.721***
	(1.250)	(1.249)	(1.255)	(1.247)	(1.264)
FNOF admits	0.0583***	0.0577***	0.0582***	0.0571***	0.0586***
	(0.0161)	(0.0161)	(0.0161)	(0.0161)	(0.0162)
FNOF admits squared	-0.00381***	-0.00376***	-0.00377***	-0.00373***	-0.00377***
	(0.00123)	(0.00124)	(0.00123)	(0.00124)	(0.00123)
Unemployment Rate	-8.418	-8.256	-8.308	-8.044	-9.151
	(6.095)	(6.088)	(6.120)	(6.077)	(6.082)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
MSOA Fixed Effects	Yes	Yes	Yes	Yes	Yes
Demographics	Yes	Yes	Yes	Yes	Yes
Observations	46,970	46,970	46,970	46,970	46,970
R-squared	0.123	0.122	0.122	0.123	0.124

Notes: *** denotes significance at 1%, ** at 5%, and * at 1% level. Observations are at the MSOA year level. Providers that conduct fewer than five annual procedures are excluded. The dependent variable in all columns is the number of admissions for an NHS-funded elective hip replacement amoungst MSOA residents.

Unanswered questions

1. Does the entry of private providers lead to improvements in quality for NHS hospitals?
2. Do private providers create demand?
3. What are the impacts of ISPs on equity?

Three things to take away

1. Competition on the basis of price has an ambiguous impact on quality
2. Competition on the basis of quality, combined with patient choice, has raised quality (but does not reduce costs)
3. The private sector now plays an important role in the healthcare market in England, although the overall share remains small

Health and Social Care Bill 2012

- **Commissioners**
  - Primary Care Trusts and Strategic Health Authorities replaced by Clinical Commissioning Groups (CCGs)
  - The new independent NHS Commissioning Board will allocate resources and provide commissioning guidance
- **Providers**
  - Monitor will become the economic regulator that oversees all aspects of access and competition in the NHS
  - Monitor will issue licenses to provide NHS-funded treatment
  - Prices are regulated (by Monitor and the NHS Commissioning Board) - competition on the basis of quality not prices

Potential Impacts?

The devil is in the implementation:

- How different are the commissioners (PCTs vs CCGs)?
- How many new providers will enter the market, and with what capacity?
- What are the implications for the finance of NHS hospitals if they lose elective patient numbers?
- What is the impact on equity?

Thank you

Arrow. (1963). Uncertainty and the welfare economics of medical care. *American Economic Review*, *53*, 941 - 973.

Burgess, S., Propper, C., & Wilson, D. (2005). *Will more choice improve outcomes in education and health care? the evidence from economic research.* Centre for Market and Public Organisation.

Cooper, Z., Gibbons, S., Jones, S., & McGuire, A. (2011, 08). Does hospital competition save lives? evidence from the english nhs patient choice reforms. *Economic Journal*, *121*(554), F228-F260. Retrieved from `http://ideas.repec.org/a/ecj/econjl/v121y2011i554pf228-f260.html`

Gaynor, M. (2006, December). What do we know about competition and quality in health care markets? *Foundations and Trends in Microeconomics*, *2*(6), 441–508. (http://www.nowpublishers.com/product.aspx?product=MIC&doi=0700

Gaynor, M., Moreno-Serra, R., & Propper, C. (2010, July). *Death by market power: Reform, competition and patient outcomes in the national health service* (NBER Working Papers No. 16164). National Bureau of

Economic Research, Inc. Retrieved from http://ideas.repec.org/p/nbr/nberwo/16164.html

Kelly, & Tetlow. (2012, November). *Choosing the place of care: the effect of patient choice on treatment location in england, 2003 - 2011.*

Naylor, C., & Gregory, S. (2009, October). *Independent sector treatment centres.* King's Fund Briefing.

Propper, C., Burgess, S., & Gossage, D. (2008). Competition and quality: Evidence from the nhs internal market 1991-9. *Economic Journal*, *118*(1), 138–170.