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GP supply and obesity

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ABSTRACT

We investigate the relationship between area general practitioner (GP) supply and individual body mass index (BMI) in England. Individual level BMI is regressed against area whole time equivalent GPs per 1000 population plus a large number of individual and area level covariates. We use instrumental variables (area house prices and age weighted capitation) to allow for the endogeneity of GP supply. We find that that a 10% increase in GP supply is associated with a mean reduction in BMI of around 1 kg/m^2 (around 4% of mean BMI). The results suggest that reduced list sizes per GP can improve the management of obesity.

1. Background

A growing proportion of the population of an increasing number of countries is obese (WHO, 1998). In England in 1980 6% of males and 8% of females in England were obese; by 2003 prevalences had trebled to 21% and 24%, respectively (Department of Health, 2003). Obesity is both a debilitating condition and an important risk factor for a number of major diseases including coronary heart disease, type II diabetes, osteoarthritis, hypertension and stroke (NHLBI, 1998).

In the UK the treatment and prevention of obesity takes place mainly in primary care (National Audit Office, 2001). Evidence on effectiveness is sparse and results are mixed. There have been few randomised controlled trials of primary care policies to reduce obesity (Harvey et al., 1999; Jain, 2005). Some commentators have argued that primary care interventions can reduce obesity. Finer (2003) suggests that the Counterweight Programme,[1] for example, is effective in reducing the burden of obesity in the community (Finer, 2003; Broom and Haslam, 2004; Counterweight Project Team, 2004a,b). The National Institute for Health and Clinical Excellence (NICE) has recently published guidelines on the treatment of obesity in primary care (NICE, 2006).

On the other hand, a recent randomised controlled trial found that offering practice teams a short training course in obesity management had little effect on patient weight (Moore et al., 2003). The House of Commons Health Committee has argued that local GPs provide a unique resource for obesity management, but expressed concern that there is only limited prescribing of cost-effective obesity drugs, that specialist obesity services were commonly closed due to lack of funds, and that

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[1] http://www.counterweight.org.

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GPs and other primary care workers often prioritised other targets ahead of obesity (House of Commons Health Committee, 2004).

These inconsistencies are not exclusive to the UK. For instance, recent evidence from the US shows that physician's advice to lose weight has positive effects on both the probability of eating fewer calories and smaller amounts of fat to lose weight and on the probability of using exercise to lose weight (Loureiro and Nayga, 2006). However, other studies have also shown that physicians rarely advise patients to lose weight (Sciamanna et al., 2000).

In this paper we use observational data to provide some additional, though indirect, evidence on whether primary care interventions can reduce obesity. We do so by using rich multi-level (individual and area) data to investigate whether, other things equal, individuals in areas with more GPs per head of population are less obese in terms of having a lower body mass index (BMI).

The approach we adopt is similar to that used in other multi-level studies to examine the overall effect of primary care on health. For example, Shi and Starfield (2000) used data from a 1996 sample of 58,000 respondents clustered in 60 communities in the US. They found that individuals were more likely to report good health if they lived in US states with more primary care physicians per capita, after controlling for gender, age, ethnicity, employment, wages, deprivation, heath insurance, physical health and smoking. Shi et al. (2002) used the same data source but made use of responses to questions about accessibility of primary care, interpersonal care and continuity of care. Better primary care was found to be associated with better physical and mental health after controlling for a wide range of covariates.

This literature has been with concerned with general health rather than obesity and has not usually taken account of the endogeneity of primary care supply. We analyse the impact of the supply of GPs on individual BMI by regressing individual level BMI against Health Authority (HA) level GP supply and a large set of individual and HA level covariates. There is a potential endogeneity problem: GP supply may be associated with unobserved factors that are also associated with BMI. Other things equal, GPs may prefer to live and work in "nice" areas and such areas may have unobserved characteristics that lead them to have populations with lower BMI. This could lead to a positive estimated effect of GPs on BMI even if GP supply has no true effect. On the other hand, there may be a negative bias. GP location decisions are also affected by the GP remuneration system. Some types of payment are related to the mix of types of patient and the composition of the patient population varies across areas. Examples include capitation payments related to the age of patients and their deprivation levels, fee per item payments for such things as night visits and flu vaccinations for high risk groups, and payments for meeting quality targets. Thus it is possible that there are higher rewards per patient in areas with higher BMI. Hence GP supply could be positively or negatively associated with BMI whether or not GP supply has an impact on BMI.

To test and control for endogeneity we use instrumental variables (IVs) for GP supply—observable characteristics that affect GP supply and are not correlated with unobserved factors affecting individual BMI. We use two area based instruments to estimate two stage last squares (2SLS) and mixed level IV models of the impact of GP supply on BMI.

2. Data and variables

2.1. Data sources

The main data source is the core sample of the *Health Survey for England* (HSE) 2000. The HSE is a nationally representative survey of individuals aged 2 years and over living in England. A new sample is drawn each year and respondents are interviewed on a range of core topics including demographic and socio-economic indicators, general health and psychosocial indicators, and use of health services. There is a follow up visit by a nurse at which various physiological measurements are taken, including height and weight.

Health Authority (HA) level GP supply measures were constructed using the General Medical Services (GMS) database held by the National Primary Care Research and Development Centre (NPCRDC).[2] In 2001 there were 95 HAs in England with a mean population of 515,517 residents (range 168,873–1,050,626). We use data on GP supply for 6 years from 1995 to 2000.

Additional HA area level data were assembled from three sources. First, we use the Allocation of Resources to English Areas (AREA) dataset for comprehensive data on deprivation and accessibility to health care services at the local authority (LA) ward level across England for the period 1996–2000 (Sutton et al., 2002; Gravelle et al., 2003). LA level data on crime rates in 2000 were obtained from the Neighbourhood Statistics branch of the Office for National Statistics,[3] and LA data on house prices for 2000 were obtained from the Land Registry.[4] The LA area level data were first converted to HA level based on 2001 HA boundaries. Mean values of the variables for each HA were computed based on the proportion of each LA ward's population resident within the HA. The HA data were then linked to the individuals in the HSE sample via their recorded HA of residence.

[2] http://www.primary-care-db.org.uk/.
[3] http://www.neighbourhood.statistics.gov.uk/home.asp.
[4] http://www.landreg.gov.uk/propertyprice/interactive/ppr_ualbs.asp.