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Title: The descriptive epidemiology and secular trends of lower back pain procedures in routine UK NHS care from 2000 to 2016

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Background: The lifetime prevalence of lower back pain is between 60% and 70%, with surgical treatments spared for those not responding to other options.

Objectives: To investigate the age, gender and socio-economic status differences in back pain procedures in the UK between 2000, 2008 and 2016.

Methods: Data was obtained from primary care electronic medical records (CPRD GOLD) linked to English hospital admissions data. Lower back procedures in patients aged 35+ were identified using OPCS-4 codes for Decompression (Dc), Fusion (F), Therapeutic injections (TI) and Denervation (Dn). Standardised incidence rates (IR) of each type of lower back procedures were calculated per 10,000 CPRD registered person years for each age group, gender, region and SES strata in 2000, 2008 and 2016. IR were also calculated for combinations of age and gender. Negative binomial regression calculated incidence rate ratios (IRR) and 95% confidence intervals.

Results: The IR of lower back procedures was 21.5 [20.7, 22.3] per 10,000 person years in 2000. This doubled by 2008 (45.5 [44.5, 46.5]) and trebled by 2016 (62.5 [60.8, 64.2]). Number of events and incidence rates of each procedure type are shown in table 1 below. The incidence of Dn has increased 6-fold whilst Dc and F have doubled. Female (IR in 2016 of 73.99 [71.43, 76.61] vs 50.08 [47.90, 52.33] in men, IRR 1.50 [1.41, 1.59]) and age are associated with back procedure rates (figure 1). Large socio-economic differences were observed, with higher procedure rates seen in the most deprived areas. These differences did however narrow over time during the study period (figure 2).

Conclusions: The incidence of lower back procedures has more than trebled since 2000. Women are more likely to have lower back procedures than men, with patients aged 65-74 the most likely to have a procedure. Procedures in those aged 75+ have become more common over time, potentially increasing the risk of post-operative complications. Socio-economic differences in the incidence of low back procedures are probably related to the known higher prevalence of back pain in deprived areas. Whether the observed narrowing in socio-economic variation over time is explained by a reduced need or by lowered provision needs further research.

Table 1: Event numbers and incidence rates of different types of lower back procedure.

	Fusion		Decompression		Therapeutic Injection		Denervation	
	Events	IR (95% CI)	Events	IR (95% CI)	Events	IR (95% CI)	Events	IR (95% CI)
2000	109	0.86 (0.71, 1.04)	466	3.69 (3.36, 4.04)	2035	16.11 (15.42, 16.82)	91	0.72 (0.58, 0.88)
2008	333	1.77 (1.58, 1.97)	1197	6.35 (6.00, 6.72)	6283	33.35 (32.53, 34.18)	596	3.16 (2.91, 3.43)
2016	159	1.93 (1.65, 2.26)	525	6.39 (5.85, 6.96)	3865	47.03 (45.56, 48.54)	487	5.93 (5.41, 6.48)

Figure 1: Age and Gender stratified incidence rate ratios of all back procedures in 2000, 2008 and 2016

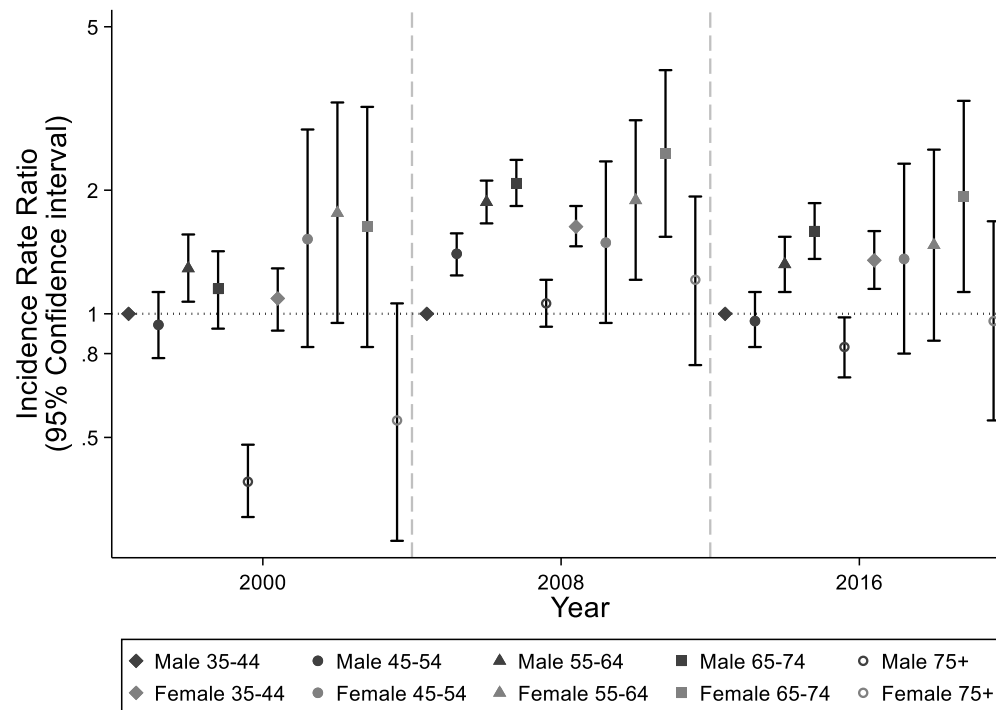


Figure 2: Deprivation status incidence rate ratios by year

