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Geographic variation in rates of common surgical procedures in France in 2008–2010, and comparison to the US and Britain

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ABSTRACT

Geographic variation in use of elective surgeries has been widely studied in the US, where over-utilization is incentivized. We wanted to explore recent trends in the geographic variation of common surgical procedures in France – where a global budget, centralized planning process, and compulsory insurance scheme are in place – and to compare measures of variation there to those in the US and Britain. For 2008–2010, we calculated French age- and sex-adjusted per capita utilization rates and four measures of geographic variation for hip fracture admission (which is standard treatment and shows minimal geographic variation across countries) and 14 elective surgical procedures. We found substantial geographic variation in age-sex adjusted per capita admission rates for elective procedures: radical prostatectomy, spine surgery, and CABG showed the greatest variation, while hip fracture, colectomy, and cholecystectomy showed the least. Among older patients, most French admission rates were lower than those seen in the US. In general, measures of geographic variation were lower in France than those reported in the US or Britain. French policymakers could use analyses of geographic variation in service utilization to inform policy, to identify areas for intervention, or to measure the effectiveness of efforts designed to reduce variation in care.

1. Introduction

Studied for over 150 years, geographic variation in population-based rates of health service utilization provides opportunities for policymakers to take action: if high variation is due to restricted access in some places, access could be improved; if it is due to overuse, incentive reform or practice standardization might unleash scarce resources and improve the efficiency of healthcare systems [1,2].

Geographic variation in health services utilization among developed countries has uncovered widespread variation in rates of virtually every procedure studied [3,4]. But it is possible that the construct of national healthcare services might influence the degree of geographic variation in health services utilization observed in a country. The predominance of a fee-for-service based reimbursement system that incentivizes over-utilization, lack of use of informed patient decision-making, and lack of consensus around acceptable practices have all been implicated in the high level of geographic variation in US surgical

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procedure rates [2,5,6]. In Britain, where a free, universal, and nationally-funded healthcare system is supplemented by 'private health insurance' that provides access to elective care in the private sector [7], rates of common surgical procedures also show substantial variation across competing and relatively autonomous Primary Care Trusts [8], similar in magnitude to that seen in the United States during the same period [9]. In France, where access to healthcare is provided through compulsory insurance that can be used in private and public hospitals (the size and makeup of both sectors are regulated by the central government in concert with regional health agencies) [10], national examinations of geographic variation in health services utilization have been limited to the incidence of inflammatory bowel disease [11], and general practitioners' antibiotic prescribing patterns [14,15].

No studies have systematically examined trends in per capita use of common surgical procedures in France, no studies have examined geographic variation of such procedures in France, and no studies have compared established measures of geographic variation in French procedure rates to those in other countries. To fill this knowledge gap, and to begin an exploration of whether health system constructs might be related to geographic variation in elective procedure rates, we used data on French admissions from 2008–2010 to compute rates of common procedures, to calculate established measures of geographic variation in France, and to compare French results to published results for the US and Britain.

2. Methods

2.1. Data sources, sample definition, and variables

We obtained data on all discharges from public and private sector French hospitals in 2008–2010 from the Agence Technique de l'Information sur l'Hospitalisation [16]. These included a unique hospitalization number, a unique patient anonymous identifier, hospitalization characteristics (the identity and location of the hospital, and length of stay), and patient characteristics (age, gender, procedure codes, primary and secondary diagnostic codes, number of diagnoses, and the district in which the patient lived). We examined fourteen elective surgical procedures that have been shown to demonstrate differing degrees of geographic variation in the United States [2,8,9,12,17–22]. We also examined admission for hip fracture because it is common practice to admit patients to the hospital for hip fracture in France [23] and, therefore, should show little geographic variation; for the same reason, it has been so used in studies of geographic variation in the United States [2,24].

To allow for international comparisons, we used ICD-10 diagnoses and the French Classification Commune des Actes Médicaux system that classifies medical interventions [25] to create similar cohorts to those used by the Dartmouth Atlas project [26]. The definitions that we used and those used for examination of variation in the United States are shown in Table 1, which also provides the total number of these procedures completed in mainland France in 2008 to 2010.

2.2. Analytic methods

2.2.1. Calculation of utilization rates

Because demographics vary by region, we used the same indirect method [27] used by the Dartmouth Atlas Project in the US and the King's Fund in the UK [8] to calculate age- and sex-adjusted utilization rates for 94 geographically-defined "departments" in mainland France; we obtained age- and sex-specific department-level population estimates from the French census [28]. For each department, year and type of admission examined (save tonsillectomy and caesarean section), we calculated rates for two age groups: 45–64 and 65–99. We also examined younger age groups for cesarean section (18–44), tonsillectomy (0–17), and three procedures that are relatively common in the 35–44 year old age group: cholecystectomy, hysterectomy, and back surgery. As France does not collect information on race, we could not adjust for geographic differences in race prevalence.

2.3. Measures of geographic variation

For 2008, 2009, and 2010, for each procedure and age group examined, we report age- and sex-adjusted national per capita rates and four established measures of geographic variation that allow for comparison across geographic settings and countries [8,9,21]:

1. The extreme ratio, which is calculated by dividing the highest geographic rate by the lowest and represents the range of absolute service utilization levels.
2. The interquartile ratio, which is calculated by dividing the rate at the 75th percentile by that at the 25th percentile and shows the relative variation in service utilization after removing the most extreme values.
3. The coefficient of variation, which is the ratio of the standard deviation to the mean and represents a normalized version of dispersion.
4. The systematic component of variation (SCV), which shows the non-random part of variation in rates by distinguishing the systematic variation between areas from the random variation within areas; to make international comparisons, we also calculated the SCV across 2008-1010. As is common practice, we multiply SCV time 10; an SCV $\times$ 10 greater than 5 indicates high variation; that greater than 10, very high variation [21].

From first to last, these measures are increasingly conservative and more stable over time.

2.4. International comparisons

To compare the systematic component of geographic variation in France to that in the US or Britain, we obtained SCV $\times$ 10 values for most procedures that we examined from published reports [8,9]. We obtained per capita