ECHO

EUROPEAN COLLABORATION FOR HEALTHCARE OPTIMIZATION

Lower Value Care in England

I. EXECUTIVE SUMMARY

Health Systems bear substantial opportunity-cost in using interventions deemed lower-value.

Quantifying the utilisation of this type of care and its systematic variation across policy-relevant geographical units offers at a glance insights about the local potential for enhancing efficiency (i.e. value-based provision of care).

In addition, geographical differences in residents' exposure to lower-value care might signal inequities in access to quality and safe care that should be tackled

- This report analyses the magnitude and the geographical variation of utilisation of five procedures deemed lower-value care in international literature: Adenotonsillectomy, c-section in low risks deliveries, hysterectomy in non-oncologic conditions, non-conservative surgery in breast cancer and prostatectomy in benign prostatic hyperplasia.

  These procedures are highly sensitive to clinical practice style (signature phenomenon, learning cascades) and supply factors (organizational and financial incentives)

- With the exception of adeno/tonsillectomy, utilisation rates of lower-value care in England can be considered middle to high, compared to other ECHO countries. In terms of volume, adenoidectomy and/or tonsillectomies, as well as hysterectomies in non oncologic conditions seem to be the most relevant.

- Though variation is significant for all LVC procedures examined (ranging from 2 to almost 5-folded chances of getting the procedure depending on the local authority of residence), the systematic component of it is relevant for certain ones, such as c-section in low risk deliveries and prostatectomy in BPH -26 and 14% of the variation across local authorities cannot be deemed random-, while for the others, the behaviour across areas seems to be quite homogeneous, with a bare 3 to 8% of the observed difference exceeding that expected by chance.

- Between 2002 and 2009, utilisation rates of lower-value care in England show a remarkably steady line and the same is true for the degree of systematic variation. Only a slight decrease in utilisation can be observed for adeno and/or tonsillectomy (9% reduction), c-section in low risk births (7%) and prostatectomy in BPH (11%)

- The distribution of lower-value care utilisation seems to be quite homogeneous across different quintiles of LA wealth. The only exception regards children exposure to adeno/tonsillectomy and women's to non-oncologic hysterectomy. In both cases, populations living in most deprived LAs bear significantly higher chances of receiving lower-value care.

- In principle, utilisation of LVC is more often explained by local medical practices; however, regional framing may still play some role in other factors

such as services availability and organisation of care paths, or incentives framework which may affect decisions locally made. Interestingly enough, the percentage of variation explained by the region is only 5 to 8 % for adenotonsillectomy, c-section and NC breast cancer surgery; but it goes up to 15% in the case of prostatectomy and 26% for hysterectomy.

- The analysis conducted, suggests that there is plenty of room for enhancing value for money in the English system. Although England shows average rates compared with the other ECHO countries, LVC utilisation have tended to remain unchanged over the period of analysis and relatively homogeneous across the country; the main driver resides at local level. Focusing on local practices, particularly learning cascades and established medical practice styles, together with patient information and empowerment in decision making, will potentially have a major impact.

- Further analysis on institutional factors underpinning overuse of LVC at Local authority level, as well organisational and budgetary local contexts and regional framing, will serve as basis for recommendations to guide relevant decision makers in tackling this allocative inefficiency. SAVINGS ARE NOT WARRANTED, the aim is fostering "value for money" i.e. avoid non-efficient public expenditure

Procedures eligible as "lower value"

- Those superseded by more cost-effective alternatives (non-conservative breast cancer surgery, Hysterectomy in non-oncologic conditions);
- There are defined types of patients for whom evidence of value is unclear (prostatectomy in BPH, c-section);
- Relatively ineffective procedures prone to over-use (adenotonsillectomy, c-section in low-risk births).

Atlas Rationale: The report analyses the actual utilisation rate per 10,000 inhabitants in each geographical area and compares it to 2 scenarios of "minimisation of Lower-value Care use":

1. All the areas in the country behave as those below percentile 10 of LVC utilisation (10% areas in the lower end of use)
2. All the areas in the country behave as those in the first quartile of LVC utilisation (25% areas in the lower end of use)

The potential for realignment is assessed as the difference between the number of procedures observed and those expected if LVC utilisation were minimised

II. INTERNATIONAL COMPARISON

The magnitude and variation of lower-value care utilisation in ECHO health systems provides a wider perspective in assessing the relative need for specific activities focused in enhancing the value of health care provided, compared to other relevant countries

This section lays out the utilisation of selected lower-value care (LVC) procedures in England compared to the other countries in the ECHO project.

Two dimensions are explored: the magnitude of the phenomenon, and the variation across the policy-relevant administrative areas in each country.

Adenoidectomy and/or tonsillectomy

Despite their indication being exceedingly restricted, these are still frequent paediatric surgical procedures. Geographical variability in utilisation of these interventions unexplained by appropriate medical indication has been registered since 1938 till nowadays

England shows the second lowest age-standardised rates of adeno/tonsillectomy across ECHO countries (*Fig 1a*); overall around 1 in 252 children below 14 years old underwent the procedure in 2009 i.e. about 2 times lower than the country with the highest rate – 1 in 120 Slovenian children were intervened in 2009 *(Table 1 in Appendix 1)*

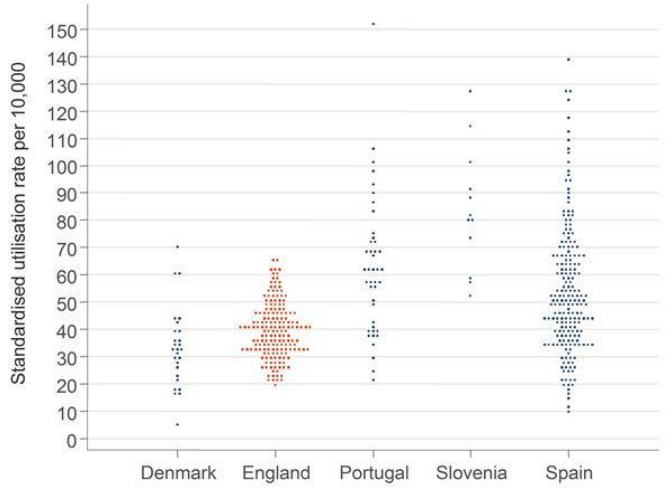


Figure 1a. Standardised rates of adenoidectomy and/or tonsillectomy per 10,000 children (natural scale). Year 2009

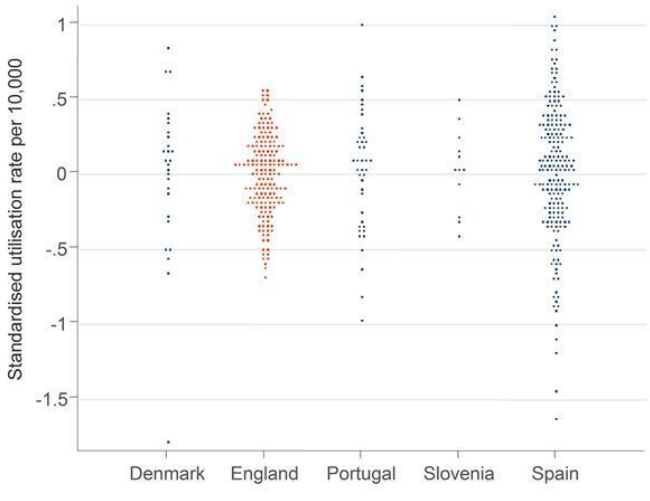


Figure 1b. Standardised rates of adenoidectomy and/or tonsillectomy per 10,000 children (normalized scale). Year 2009

** Each dot represents the relevant administrative area in the country (Local Authorities for England). The y-axe charts the rate per 10,000 inhabitants (up to 14 years old) The figure is built on the total number of interventions in 2009 in those countries. In Figure 1b utilisation rates have been normalised to ease comparison of the degree of variation across countries.*

The ratio between the highest and lowest rates in England is one of the smallest across ECHO (half of that in Spain), but still leaves children living in high rate local authorities with a 2.5-folded chance of getting the procedure *(Fig 1b. See also Table 1 in Appendix 1).*

The systematic component of this variation has proven relevant in all countries examined, ranging from 9 to 66 % beyond that randomly expected.

Caesarean section in low risk pregnancies and deliveries

C-section is considered a highly effective procedure in avoiding maternal and child mortality at birth as well as complications derived from foetal distress. However, in the last decade, literature is abounding in evidence of overuse, and, particularly, misuse in lower-value indications such as low risk and normal births.

England's 20.3 C-sections in low risk births per 10,000 women in reproductive age lays in the middle of the range across ECHO countries; similar to Slovenian rate, it halves Danish figures, while doubling and 5-folding Spanish and Portuguese *(Fig 2a and Table 1 in Appendix 1)*. Interestingly enough, regardless the size of the rate, variation for this procedure across the territory seems to be remarkable in all countries. In England it is relatively high: almost 5-folded probability for women living in those areas with the highest rates; Spanish healthcare areas, on their side, range between null cases and figures rising close to Danish kommuners, as a result the ratio of probability between extremes rockets till 50 *(Fig 2b and Table 1 in Appendix 1)*.

The systematic component of this variation is also large across the countries examined, exceeding that expected by chance in a range from 50% to more than 6 times *(Fig 2. b and Table 1 in Appendix)*.

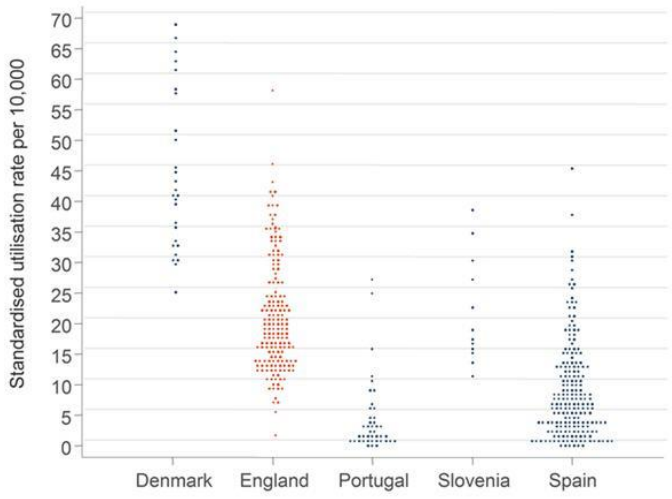


Figure 2a. Standardised Rates of C-Section in low-risk cases per 10,000 women in reproductive age (natural scale) . Year 2009

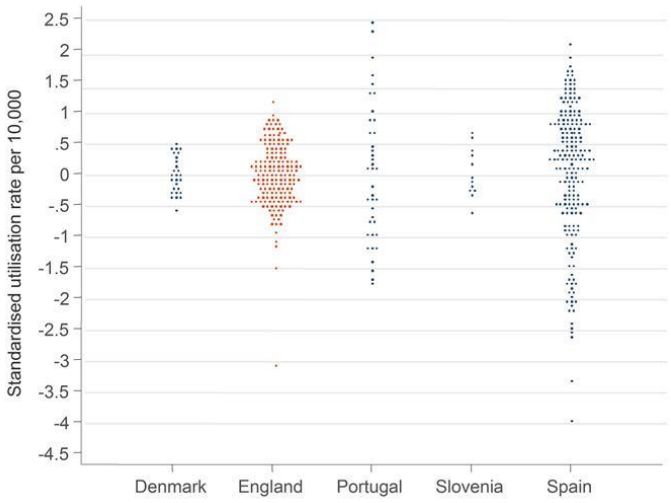


Figure 2b. Standardised Rates of C-Section in low-risk cases per 10,000 women in reproductive age (normalised scale) . Year 2009

** Each dot represents the relevant administrative area in the country (Local Authorities for England). The y-axe charts the rate per 10,000 inhabitants (women in fertile age 15-55.) The figure is built on the total number of interventions in 2009 in those countries. In Figure 2b utilisation rates have been normalised to ease comparison of the degree of variation across countries*

Hysterectomy in non-oncologic conditions

Hysterectomy is one of the safest and most appropriate procedures in dealing with uterus cancer. However, its indication for other gynaecological conditions such as bleeding or uterine myoma is controversial and not the first line approach. In those cases hysterectomy could be considered lower-value care.

English rate of hysterectomy in non-oncologic conditions (one in 526 adult women in a year) ranks at the middle of ECHO range; just below Denmark and Portugal, above the one in 677 women observed in Spain -the country with lowest rate *(figure 3.a and Table 1 in Appendix 1)*.

Compared to other cases of LVC presented in this report, the variation in utilisation across countries seems less marked, ranging from 14.77 to 21.84 hysterectomies per 10,000 adult women; likewise, within country variation is smaller than for other LVC procedures, though still significant, particularly in Spain *(see Fig 3.b and Table 1 Appendix).* However, the systematic component of this variation (beyond random variation) is low to moderate across them.

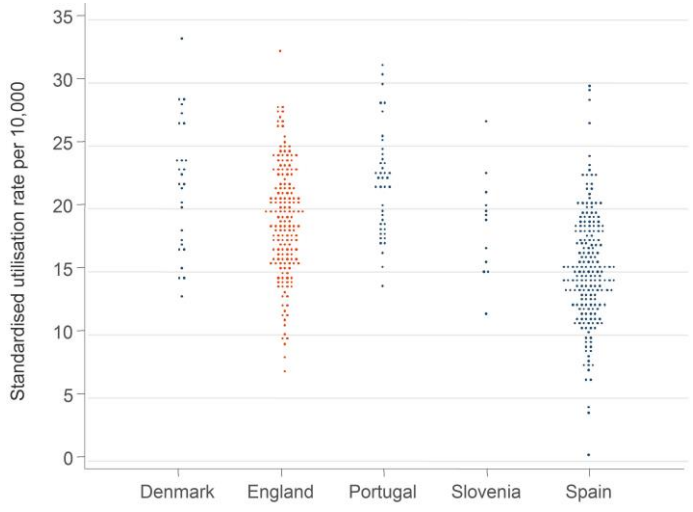


Figure 3a. Standardised Rates of Hysterectomy in non-oncologic conditions per 10,000 women. (natural scale) . Year 2009

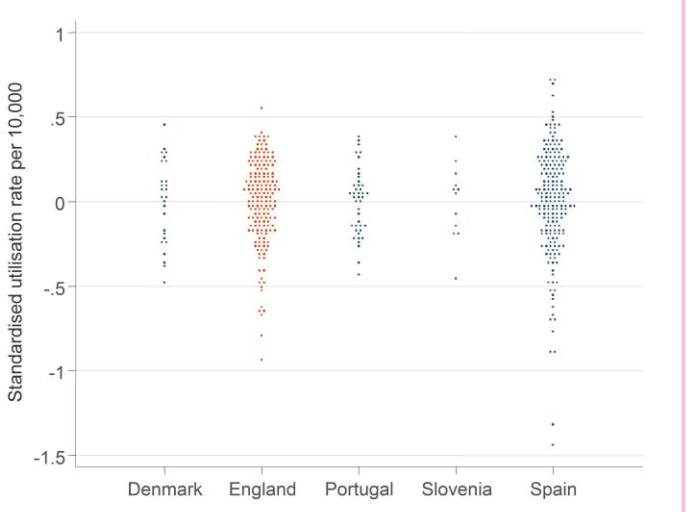


Figure 3b. Standardised Rates of Hysterectomy in non-oncologic conditions per 10,000 women. (normalised scale) . Year 2009

** Each dot represents the relevant administrative area in the country (Local Authorities for England). The y-axe charts the rate per 10,000 inhabitants (women 18 years old and older.) The figure is built on the total number of interventions in 2009 in those countries. In Figure 3b utilisation rates have been normalised to ease comparison of the degree of variation across countries*

Non conservative surgery in breast cancer

The current therapeutic approach for breast cancer includes surgery, often followed by hormonal therapy and radiotherapy. Surgical treatment can be conservative (CS), which preserves part of breast glandular tissue, or non-conservative treatment (NCS) which entails total removal of breast glandular tissue, maintaining or not the skin tissue. CS is recommended, at any stage of breast cancer on the basis of less complications and better quality of life, confining the use of NCS to those situations where the tumour's size relative to total breast mass prevents conservative resection.

The rate of non-conservative breast surgery in England is the second highest among ECHO countries; two points lower than the Danish, it is 50% higher than that in Spain (6.22 vs 4.31 per 10,000 women) *(Figure 4a and Table 1 Appendix 1)*. In addition, women living in those Local Authorities with the highest rates have almost twice the probability of getting non-conservative surgery than those living at the bottom of the range; the same is true for women in Denmark and Portugal, though utilisation rates are a bit lower in the latter; this ratio increases to almost 4 times for Spanish and Slovenian women *(Figure 4b and Table 1 Appendix 1)*.

However, the systematic component of this variation is uniformly below 10% in all countries but Denmark, where almost 60% of the observed variation compared to ECHO areas cannot be deemed random *(Table 1 Appendix 1)*..

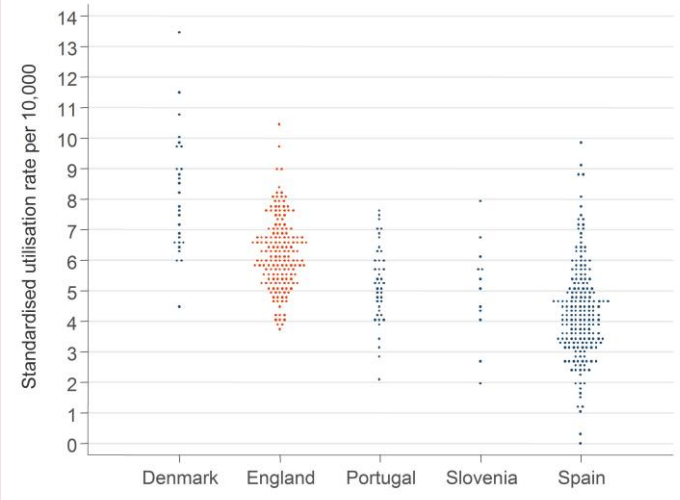


Figure 4a. Standardised Rates of non conservative surgery in breast cancer per 10,000 women (natural scale) . Year 2009

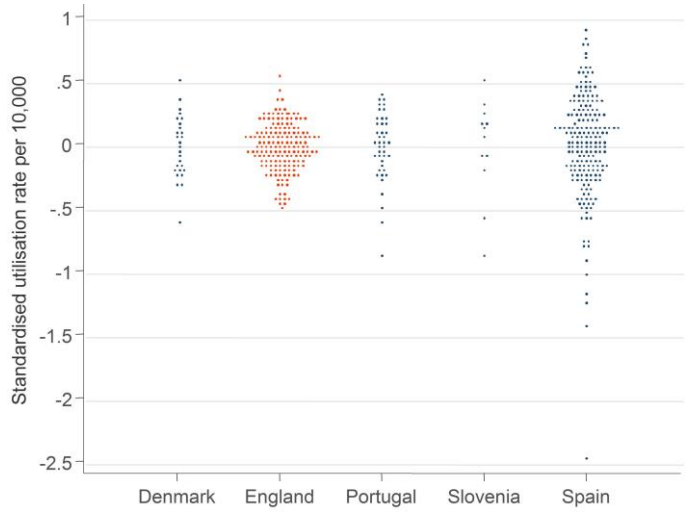


Figure 4b. Standardised Rates of non conservative surgery in breast cancer per 10,000 women (normalised scale) . Year 2009

** Each dot represents the relevant administrative area in the country (Local Authorities for England). The y-axe charts the rate per 10,000 inhabitants (women) The figure is built on the total number of interventions in 2009 in those countries. In Figure 4b utilisation rates have been normalised to ease comparison of the degree of variation across countries*

Prostatectomy in benign prostatic hyperplasia

Open prostatectomy is the oldest surgical method to treat heavily symptomatic benign prostatic hyperplasia (BPH). This method is still preferred if the prostate is very large but, in general terms, it has been superseded by less invasive interventions, such as transurethral resection of the prostate (TURP) and should be considered lower-value care. However, there is growing evidence on overuse of surgical options (specially those less invasive) in dealing with BPH and, in particular, misuse in asymptomatic or minor cases.

England shows, comparatively intermediate rates of prostatectomy in BPH -1 intervention in 665 adult men each year, middle way from the 1 in 452 in Denmark to the numbers observed in the countries with the lowest rates, Portugal and Slovenia, around 1 in 800 adult men *(Figure 5a and Table 1 Appendix 1)*. Regarding the ratio between extreme areas, Slovenia shows the highest (6-folded) followed by Denmark and Spain with adult men living in the highest rate areas bearing 4 times more chances of getting a prostatectomy, while the equivalent English men face a 3-folded probability *(Figure 5b and Table 1 Appendix 1)*. The systematic component of this variation was relevant across all countries examined, ranging from 10 to almost 50% not amenable to randomness.

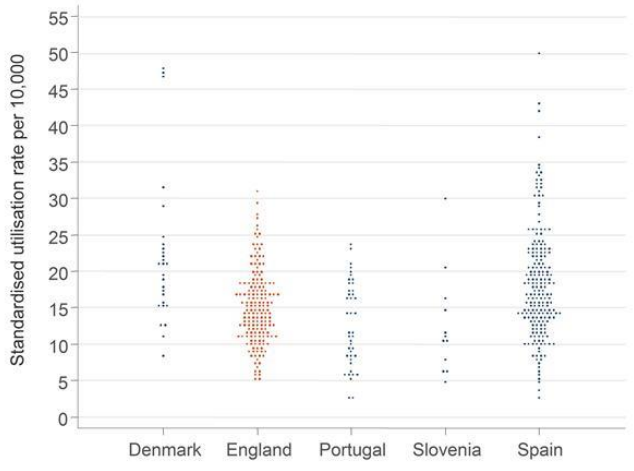


Figure 5a. Standardised Rates of prostatectomy in BPH per 10,000 men (natural scale) . Year 2009

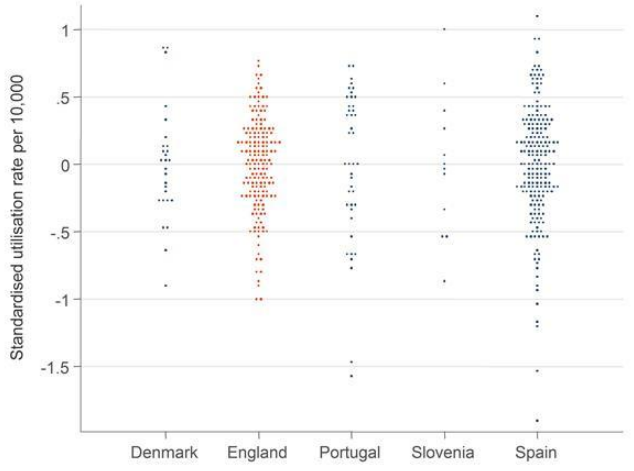


Figure 5b. Standardised Rates of prostatectomy in BPH per 10,000 men (normalised scale) . Year 2009

** Each dot represents the relevant administrative area in the country (Local Authorities for England). The y-axe charts the rate per 10,000 inhabitants (men 40 year old and older) The figure is built on the total number of interventions in 2009 in those countries. In Figure 5b utilisation rates have been normalised to ease comparison of the degree of variation across countries*

III. IN COUNTRY VARIATION

The higher the rate of utilisation of lower value care, the higher the room for enhancing efficiency.

The higher the systematic variation across areas the larger the chances of inequitable exposure to lower-value care linked to the place of residence.

With the exception of adeno/tonsillectomy, utilisation rates of lower-value care in England can be considered middle to high, compared to other ECHO countries. In terms of volume, adenoidectomy and/or tonsillectomies, as well as hysterectomies in non oncologic conditions seem to be the most relevant *(Table 2 in appendix 2)*.

Though variation is significant for all LVC procedures examined (ranging from 2 to almost 5-folded chances of getting the procedure depending on the local authority of residence), the systematic component of it is relevant for certain ones, such as c-section in low risk deliveries and prostatectomy in BPH -26 and 14% of the variation across local authorities cannot be deemed random-, while for the others, the behaviour across areas seems to be quite homogeneous, with a bare 3 to 8% of the observed difference exceeding that expected by chance.

Along the following pages, the geographical pattern of utilisation for each procedure will be presented, mapping out two relevant tiers in the health system organisation: local authorities (LAs) and Government office for the regions (GOR).

Whenever possible, proxies of "burden of disease" or utilisation of related or alternative procedures have been included in the analysis to better characterise the observed phenomena.

The potential for minimisation of LVC utilisation is also mapped out; each geographical area is identified by their distance in excess-cases to the desirable benchmark; to this end, two scenarios have been adopted: the first takes as reference the behaviour of the 10 LAs with the lowest rates (10% at the bottom of the range of use); the other scenario, more conservatively, benchmarks against the 25 lowest rates in the country (percentile 25th of utilisation and below).

Although, in principle, utilisation of LVC is more often explained by local medical practices, GORs framing may still play some role in other factors such as services availability and organisation of care paths which may affect decisions locally made. Interestingly enough, the percentage of variation explained by the region is only 5 to 8 % for adenotonsillectomy, c-section and NC breast cancer surgery; but it goes up to 15% in the case of prostatectomy and 26% for hysterectomy.

Variation in utilisation of each LVC procedure is represented using two geographical units: 326 Local Authorities and 9 regions (GORs). Analysis by LAs would be more linked to local medical practices, whilst regions could be considered a surrogate for regional policies affecting all the LAs within.

Adenoidectomy and/or tonsillectomy

These are still very frequent paediatric surgeries, despite their indication being restricted to a relative small fraction of the children: those with significant obstructive apnoea (adenotonsillectomy), recurrent otitis media and ventilation-tube placement, or with chronic/recurrent sinusitis and failure of appropriate antibiotic therapy (adenoidectomy) and children with severe acute recurrent tonsillitis (tonsillectomy). Geographical variability unjustified by appropriate medical indication has been recorded for these procedures since 1938 to nowadays.

The highest quintile of age-standardised utilisation rates in England includes LAs ranging between 60 and 84 interventions per 10,000 children, while the lowest goes from 11 to 30. The geographic pattern seems to point out a certain concentration of high rates in the diagonal between northwest and southeast, with other spots around Durham and Newcasttle and at the southwest end, Cornwall; leaving the rest of the country with relatively lower rates (pale areas in figure 6).

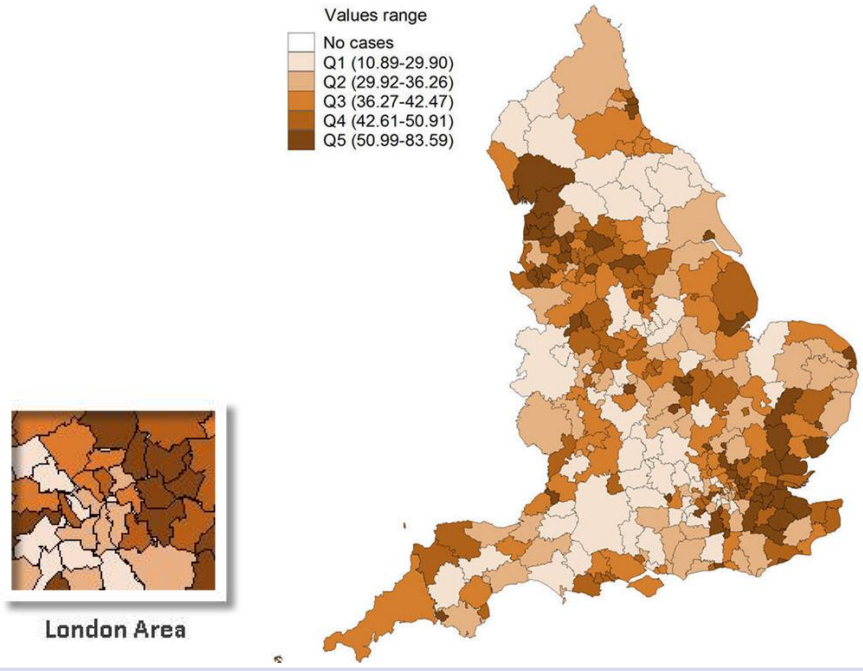


Figure 6. Age-sex standardised adenoidectomy and/or tonsillectomy utilisation rate per 10,000 children up to 14 years old. 326 Local Authorities. Year 2009

** The darker the brown, the higher the exposition to adenotonsillectomy of children living there. Local Authorities are clustered into 5 quintiles according to their rate value (Q1 to Q5). –legend provides the range of standardised rates within each quintile.*

When the analysis is conducted by GOR, North West, East of England and Yorkshire and the Humber stand out, though differences are, logically, much more attenuated in figure 7 than they were in 6, where the full range of variation within a GOR was displayed rather than smoothed out. The regional level only explains 5% of the observed variation, suggesting that the main driver is medical practice at LA level *(Table 2 in Appendix 2)*

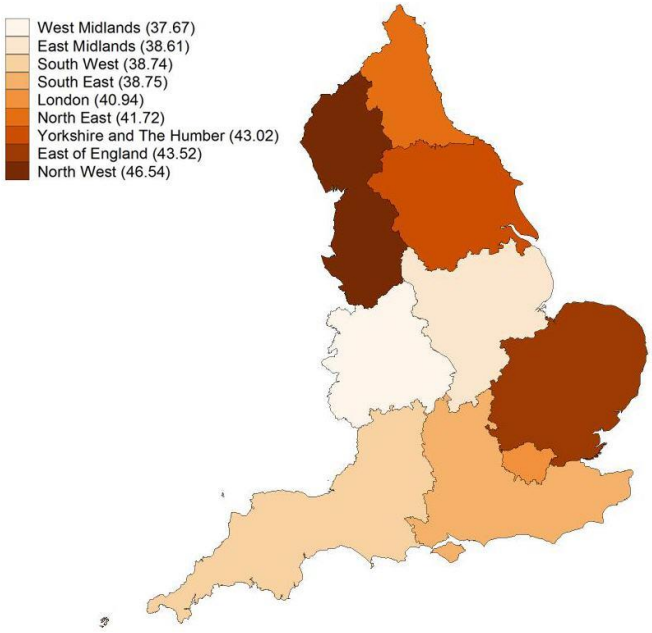


Figure 7. Age-sex standardised adeno and/or tonsillectomy utilisation rate per 10,000 children up to 14 years old. 9 regions. Year 2009

Therefore, the larger opportunities for minimising the use of adeno/tonsillectomy are to be found following the described LAs' pattern *(figures 8 and 9)*. Those areas more in need of intervention to decrease use would be performing up to 240 excess adeno/tonsillectomy per year in the most conservative scenario (290 when using the more demanding benchmark in scenario II). The overall number of excess interventions in the country in 2009 can be conservatively estimated around 13,600 *(Table 3 in Appendix 1)*

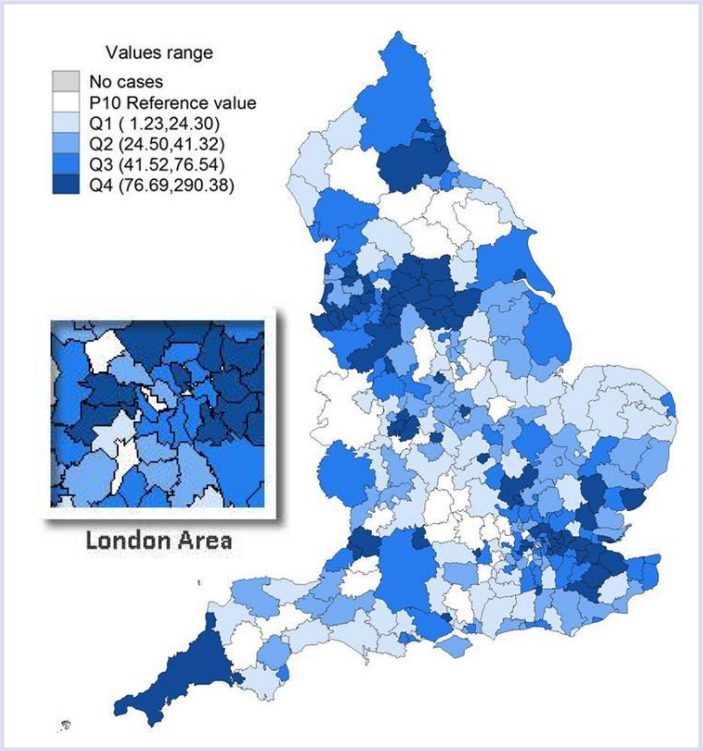


Figure 8.a. Excess cases adenotonsillectomy per Local Authority. Scenario I minimisation to p10. 326 Local Authorities. Year 2009

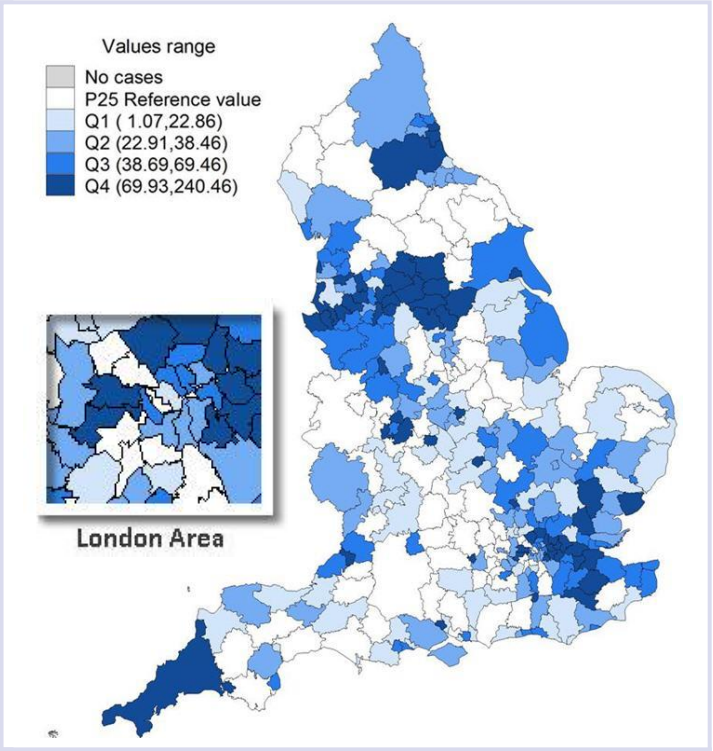


Figure 8.b. Excess cases adenotonsillectomy per Local Authority. Scenario II minimisation to p25. 326 Local Authorities. Year 2009

** The darker the blue the larger the difference between the observed number of cases and the benchmark (expected number of cases if they behaved as those Local Authorities with the lowest utilisation rates –p10 and p25). Local Authorities are clustered into 5 quintiles according to their level of excess cases (Q1 to Q5). –legend provides the range within each quintile.*

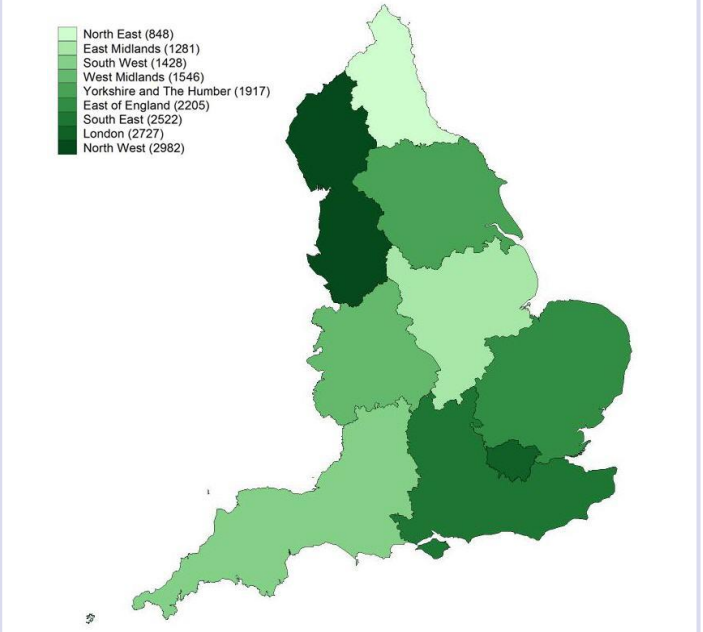


Figure 9.a. Excess cases adenotonsillectomy. Scenario I minimisation to p10. 9 regions. Year 2009

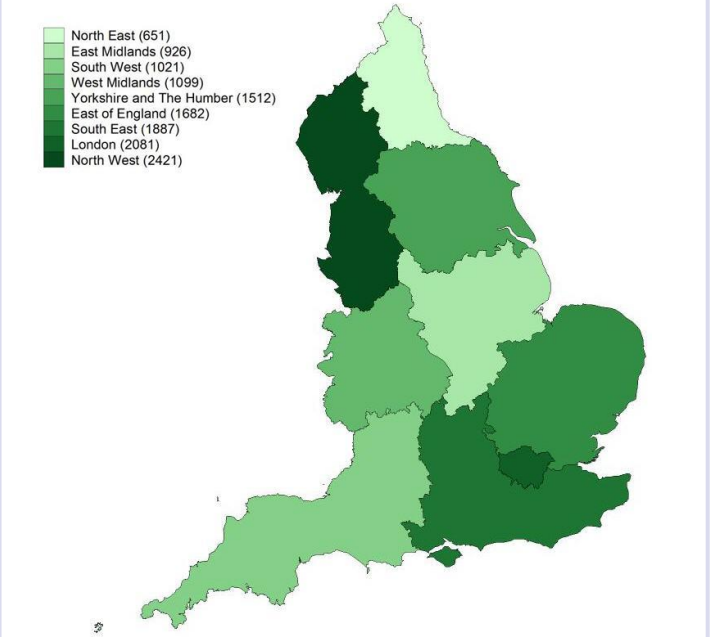


Figure 9.b. Excess cases adenotonsillectomy. Scenario II minimisation to p25. 9 regions. Year 2009

** The darker the green the larger the number of excess cases estimated at region level, if all the Local Authorities behaved as the benchmark of minimal utilisation –p10 and p25 -, legend provides values for each region.*

Cesarean section in low risk births.

C-section is considered a highly effective procedure in avoiding maternal and child mortality at birth as well as complications derived from foetal distress. However, in the last decade, literature is abounding in evidence of overuse, particularly misuse in lower-value indications such as low risk and normal pregnancies and deliveries.

First, a glance at the c-section use in any condition in England and how it relates to burden of disease -measured as rate of pregnancies and deliveries with complications per 10,000 women *(see definitions in Appendix 4)*. Figures 9 and 10 illustrate how burden of disease maps out across LAs, both in absolute terms (standardised rates) and expressed in relative risk of complications (ratio observed to expected). Excess burden of this condition seems to spread across the country following no defined pattern *(blue shades in figure 10)*

A certain overlapping, even if imperfect, between the mapping of higher relative risk of births with complications and more intensity in utilisation of c-sections can be reasonably expected. However, the pattern revealed in figure 11 shows a great deal of incongruence when compared with those arising in figure 9 and 10. The conclusion that can be drawn is that the intensity of c-section in several LAs (particularly Great London and the areas south to it, as well as Devon, Dorset, and Herefordshire) seems to be driven by factors other than need.

Exploring the degree of correspondence between c-section utilisation patterns and c-section in low risk deliveries (lower-value care) yields a much more congruent picture *(figures 11 and 12)*. This suggests that, in most of those LAs with high c-section rates, women might be bearing a higher exposure to lower-value care. However, it is worth noting that there are also areas with low-medium intensity of c-section use that seem to suffer high levels of exposure to lower-value interventions (LAs in North Yorkshire, Warwickshire, Northamptonshire, Hertfordshire and Essex). An extreme case would be Cornwell and parts of Devon, where relative risk of complications 20-50% above the average, coexists with one of the lowest c-section rates in the country.

The ratio across areas in the extremes of the utilisation range goes up to almost 5-fold probability of undergoing a c-section during a low risk delivery, depending on the place of residence (*Table 2 Appendix 2*); 26% of this variation cannot be deemed random.

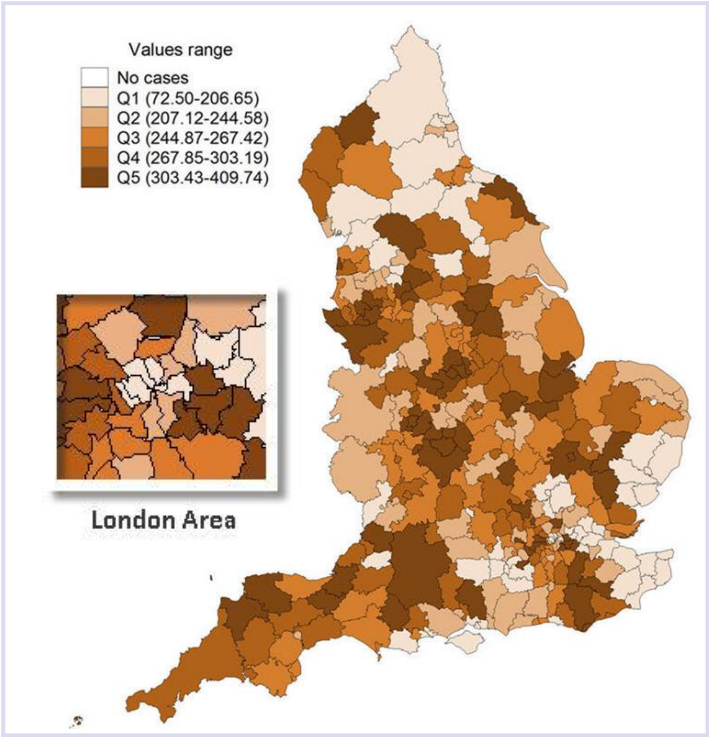


Figure 9. Age standardised Births with complications rate per 10,000 women. 326 Local Authorities. Year 2009

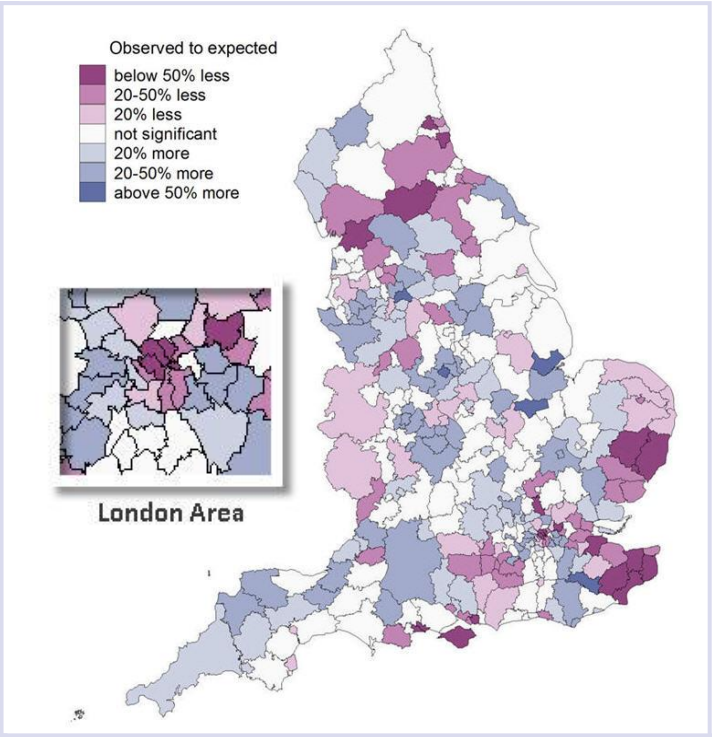


Figure 10. Admissions Ratio Observed/expected Births with complication. 326 Local Authorities. Year 2009

** Map on the right: The darker the brown, the higher the risk of complications among women living there. Local Authorities are clustered into 5 quintiles according to their rate value (Q1 to Q5). –legend provides the range of standardised rates within each quintile. Map on the left: relative risk for women living in the Local Authority compared to the expected average burden. Blue shades flag areas with excess risk (overexposure); pink shades denote risk below the expectation, thus, relative protection compared to the rest of the country. White areas correspond to average relative risk (observed/expected=1)*

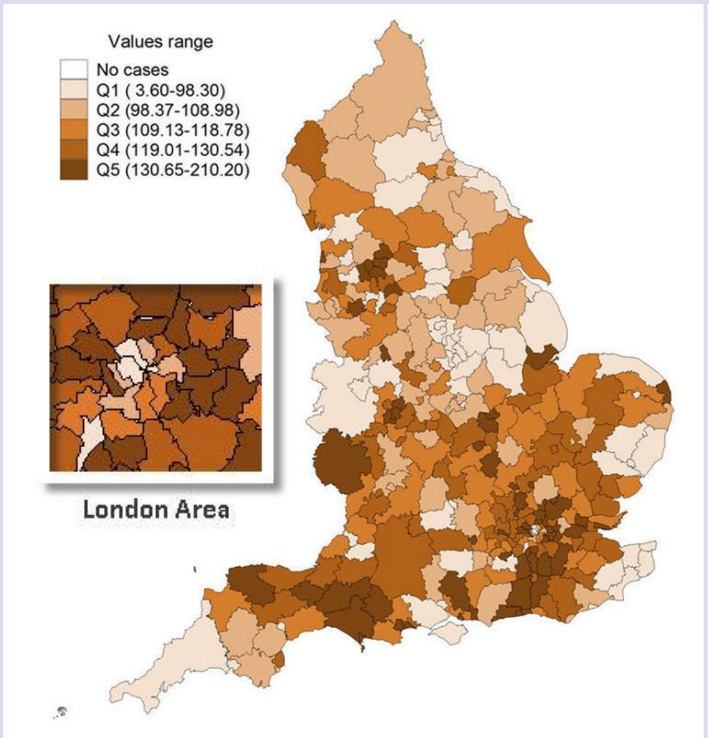


Figure 11. Age standardised c-section rate per 10,000 women aged 15-55. 326 Local Authorities. Year 2009

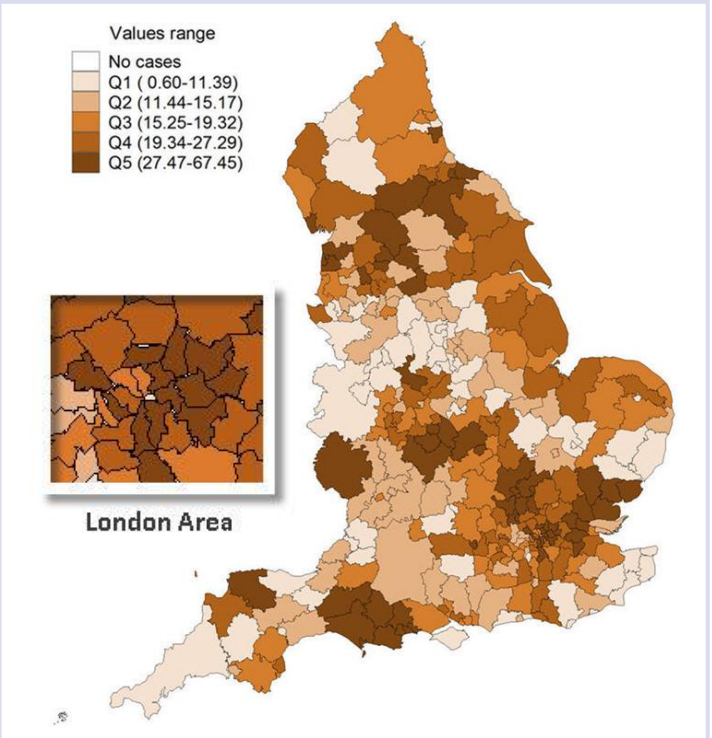


Figure 12. Age standardised c-section rate in low risk deliveries per 10,000 women aged 15-55. 326 Local Authorities. Year 2009

** The darker the brown, the higher the probability of getting the procedure among women in reproductive age living there. Local Authorities are clustered into 5 quintiles according to their rate value (Q1 to Q5). –legend provides the range of standardised rates within each quintile.*

The regional level seems to explain a bare 6% of the detected variation across LAs (*Table 2 in appendix 2, ICC*).

When the analysis is conducted by GOR, the mismatching between burden of births with complications and intensity in use of c-section becomes more severe (figures 13 to 15); particularly in London and East of England with average and low rates of complicated births but among the highest of c-section; conversely women living in Southwest and East England bear higher burden of complications and among the lowest intensity in C-section.

The regional pattern of lower value c-sections seems to somehow depart from the overall c-section intensity *(figures 15 and 16);* in Yorkshire and North West relative low rates of c-section correspond to the highest regional level of lower-value procedures. The opposite pattern can be detected in West midlands, and to a lesser extent North West, showing among the largest rate of c-section, but one of the smallest for the lower-value indication.

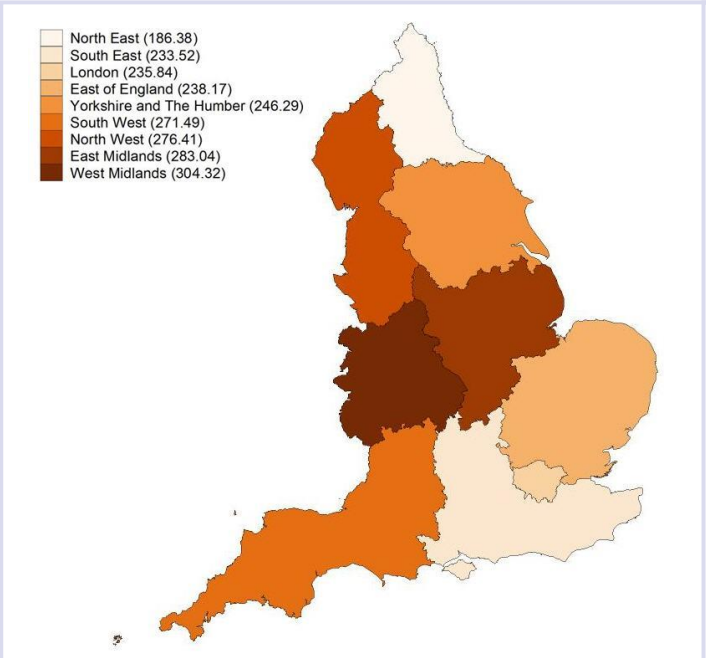


Figure 13. Age standardised Births with complications rate per 10,000 women. 9 regions. Year 2009

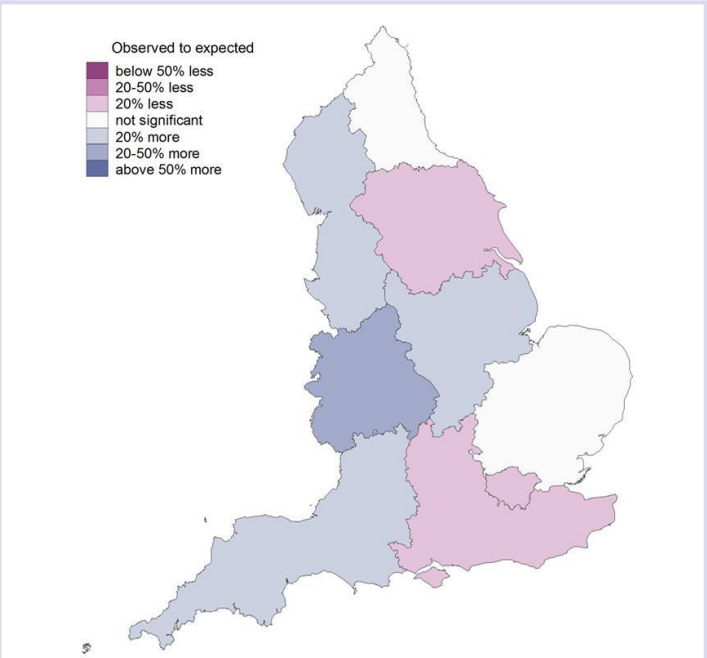


Figure 14. Admissions Ratio Observed/expected Births with complication. 9 regions. Year 2009

** Map on the left: The darker the brown, the higher the exposition to complications among women in reproductive age living in that region –legend provides the actual values of the standardised rate. Map on the right: relative risk for women living in the region compared to the expected average exposure. Blue shades flag areas with excess risk (overexposure); pink shades denote risk below the expectation, thus relative protection or under-exposure compared to the rest of the country. White areas correspond to average relative risk (observed/expected=1)*

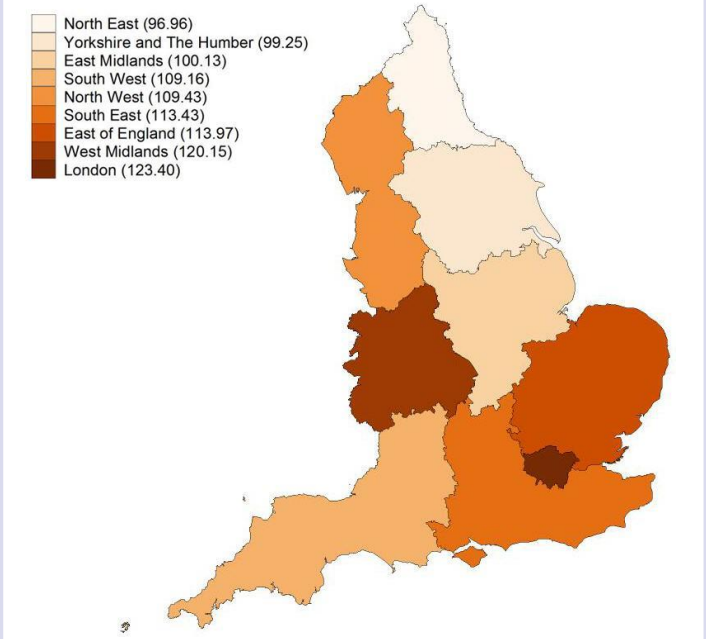


Figure 15. Age standardised c-section rate per 10,000 women aged 15-55. 9 regions. Year 2009

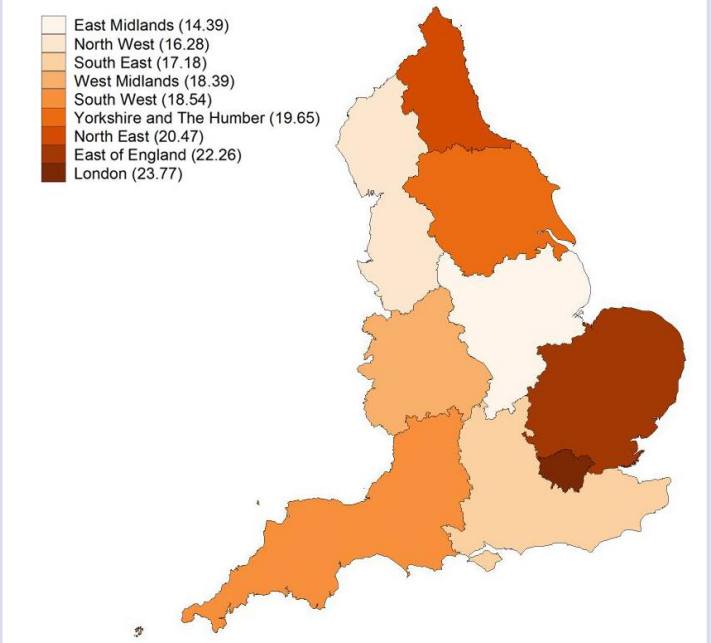


Figure 16. Age standardised c-section rate in low risk deliveries per 10,000 women aged 15-55. 9 regions. Year 2009

The distance between the observed exposure to lower value c-sections and the optimisation benchmarks is represented in figures 17 and 18 for the two tiers of administration relevant in health, LAs and GORs.

The most conservative scenario of minimisation (figures 17.b and 18.b) quantifies the excess lower value c-sections in England in a year in almost 14 thousand interventions (*Table 3 appendix 2*). The distribution of those cases is, obviously, uneven across LAs and GORs; figures 17.a and b map out in darker shades those LAs that may be a priority target for measures to reduce the utilisation of c-sections in low risk births (the maximum local potential for reduction estimated in between 75 and 400 interventions per year –Q4 in figures 17.a and b).

The same quantification for potential reduction in use of lower value c-sections was conducted at regional level (figures 18.a and b). The most conservative scenario *(Fig 18.b)* estimates regional impact in lower-value interventions in between 560 and 3800, while in the more demanding it ranges from 800 to 4500 c-sections per year, depending on the GOR.

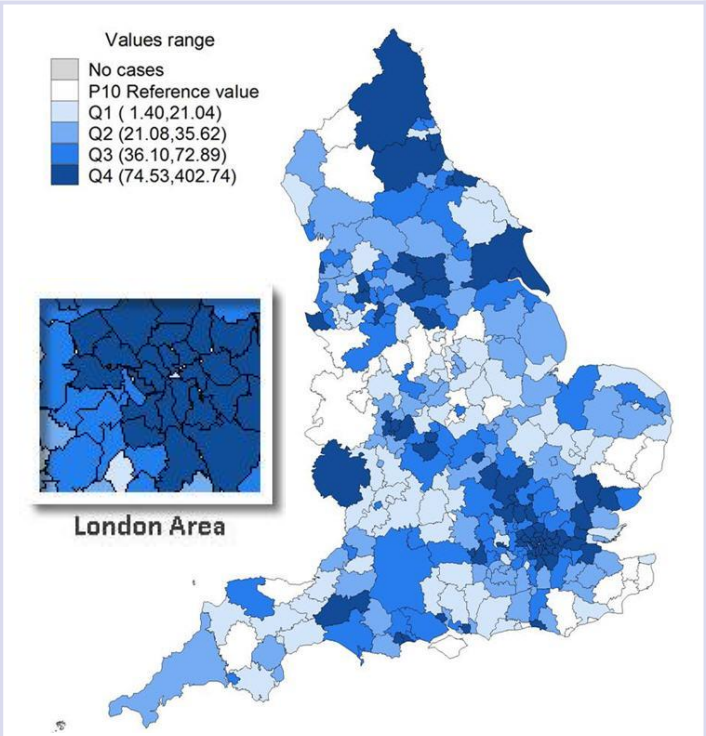


Figure 17.a. Excess cases c-section in low risk deliveries per Local Authority. Scenario I minimisation to p10.
326 Local Authorities. Year 2009

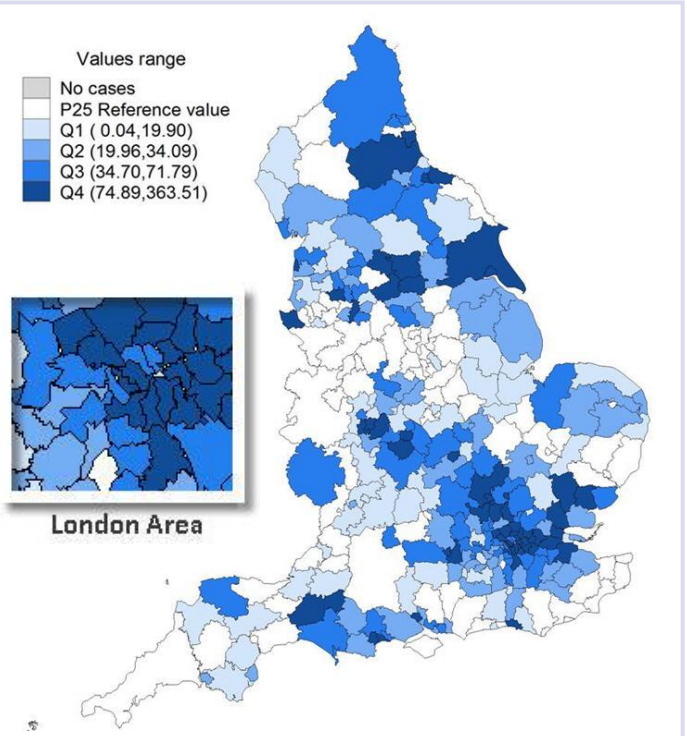


Figure 17.b. Excess cases c-section in low risk deliveries per Local Authority. Scenario II minimisation to p25.
326 Local Authorities. Year 2009

** The darker the blue the larger the difference between the observed number of cases and the benchmark (expected number of cases if they behaved as those Local Authorities with the lowest utilisation rates –p10 and p25). Local Authorities are clustered into 5 quintiles according to their level of excess cases (Q1 to Q5). –legend provides the range within each quintile.*

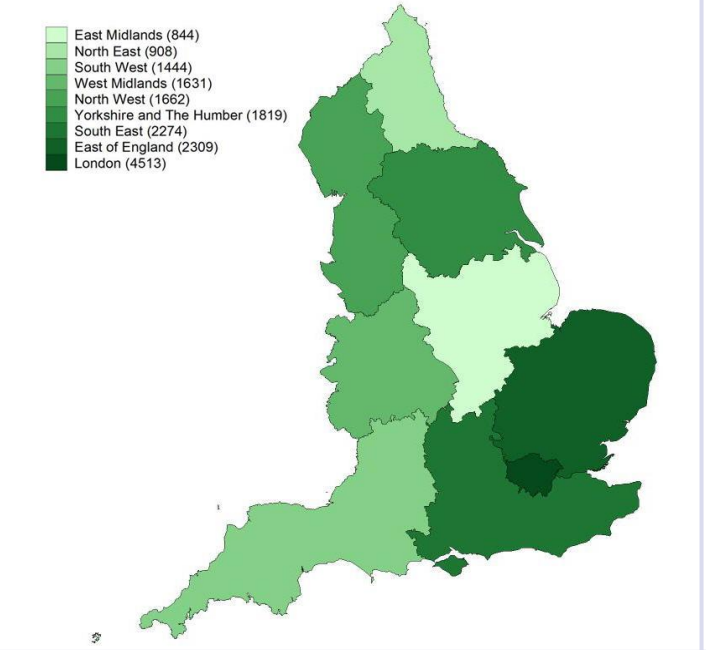


Figure 18.a. Excess cases c-section in low risk deliveries
Scenario I minimisation to p10. 9 regions. Year 2009

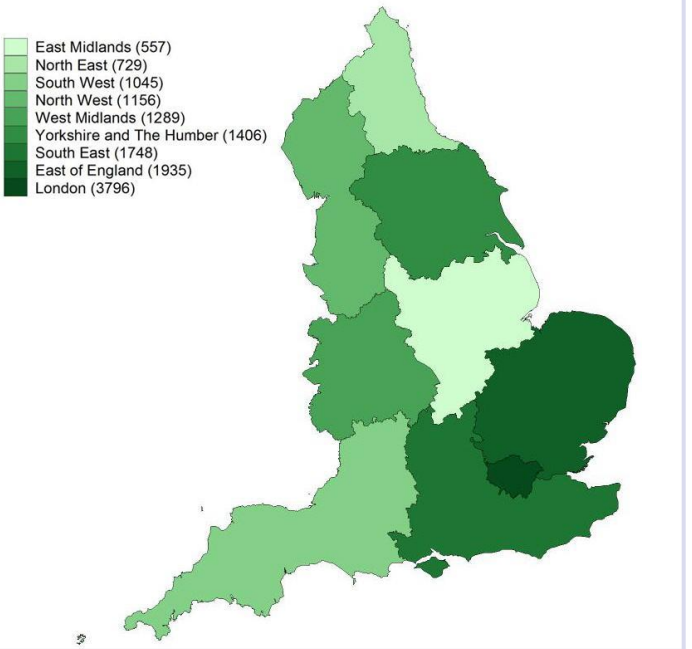


Figure 18.b. Excess cases c-section in low risk deliveries.
Scenario II minimisation to p25. 9 regions. Year 2009

** The darker the green the larger the number of excess cases estimated at region level, if all the LAs behaved as the benchmark of minimal utilisation –p10 and p25 -legend provides values for each region.*

Hysterectomy in non-oncologic conditions

Hysterectomy is one of the safest and most appropriate procedures in dealing with uterus cancer. However, its indication for other gynaecological conditions such as bleeding or uterine myoma is controversial and not the first line approach. In those cases hysterectomy could be considered lower-value care.

Figures 19 and 20 allow for a comparison of the distribution of the two types of hysterectomy indication across LAs in England

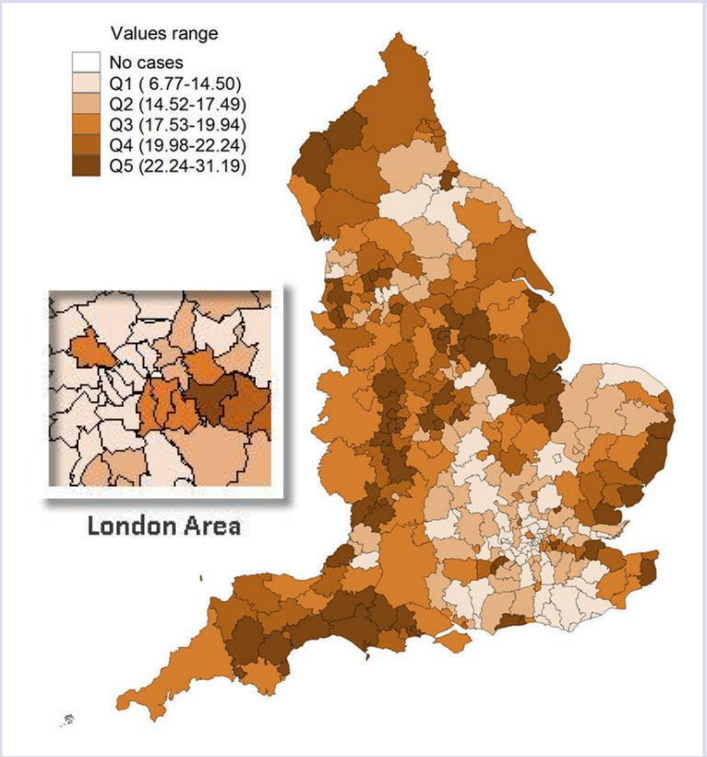


Figure 19. Age-standardised Hysterectomy non-oncologic diagnosis utilisation rate per 10,000 women aged 18 years or older. 326 Local Authorities. Year 2009

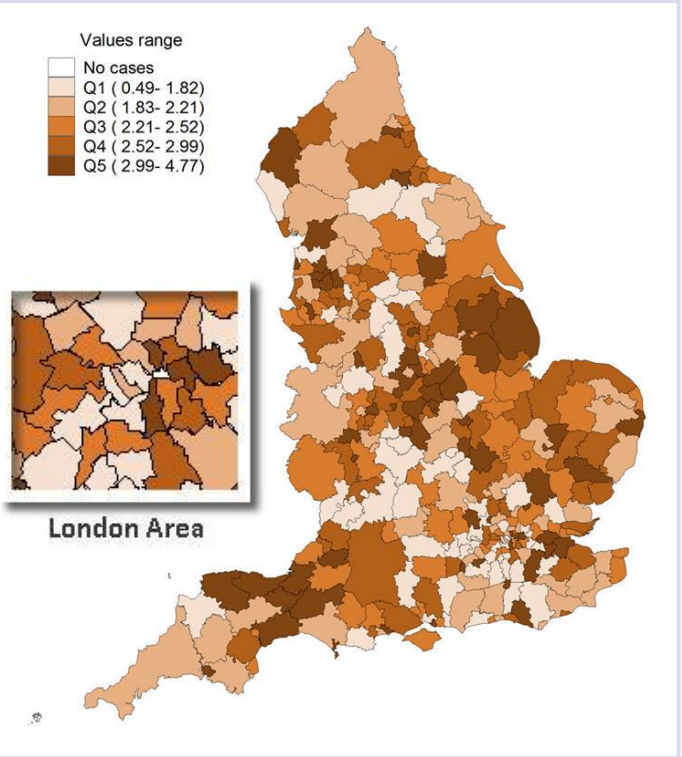


Figure 20. Age-standardised Hysterectomy in uterus cancer utilisation rate per 10,000 women. 326 Local Authorities. Year 2009

** The darker the brown, the higher the exposition to hysterectomy of women living there. Local Authorities are clustered into 5 quintiles according to their utilisation rate value (Q1 to Q5). –legend provides the range of standardised rates within each quintile.*

It is worth noting that utilisation rates for the lower-value indication are significantly higher overall than for the adequate one (LAs with highest hysterectomy utilisation rates in the cancer indication range between 3 and 5 procedures per 10,000 adult women, escalating to 22 to 31 interventions for the lower-value indication).

Furthermore, excluding the cancer indication, the variation in women's probability to get a hysterectomy could be as large as more than 2 times, depending on their LA of residence (*Table 2, appendix 2*).

Although only 6 % of this variation can be deemed not random (systematic), the GOR where the LA belongs seems to explain almost 30% of it; this suggests a role for regional policy and/or services organisation in modulating local clinical practice.

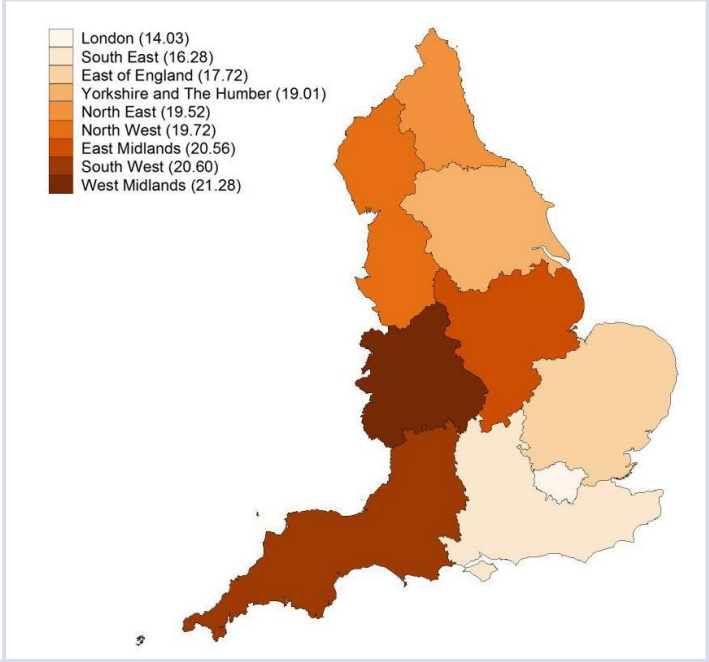


Figure 21. Age-standardised Hysterectomy non-oncologic diagnosis utilisation rate per 10,000 women aged 18 years or older.
9 regions. Year 2009

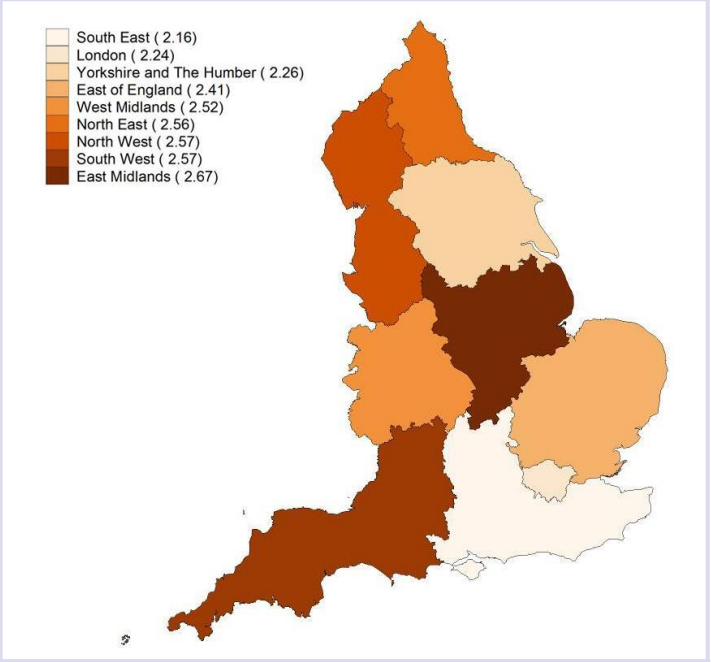


Figure 22 Age-standardised Hysterectomy in uterus cancer utilisation rate per 10,000 women.
9 regions. Year 2009

Using GORs as the unit of analysis (figures 21 and 22), the intensity of use of both cancer and lower-value hysterectomy indications seem to correlate with the exception of West Midlands where the highest rate of lower-value intervention concurs with the fifth position for oncologic hysterectomies. Nevertheless, the degree of variation across GOR is exceedingly low for the oncologic intervention

2.16 to 2.67 per 10,000 women, while lower-value hysterectomy rates ranges from 14 to 21.

The potential for minimisation of lower-value hysterectomy use at LA-level is summarised in figures 22 and 23, for the two usual scenarios: The most conservative one, using as benchmark the LAs in the lowest quartile of use, yields a range of excess cases per area from 3 to 238 per year

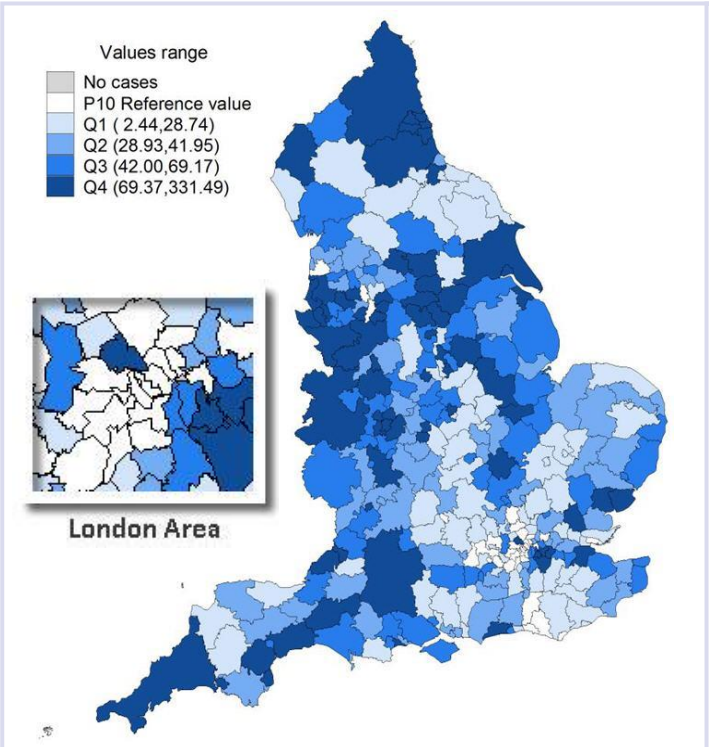


Figure 22. Excess cases Hysterectomy without uterus cancer diagnosis per Local Authority. Scenario I minimisation to p10. 326 Local Authorities. Year 2009

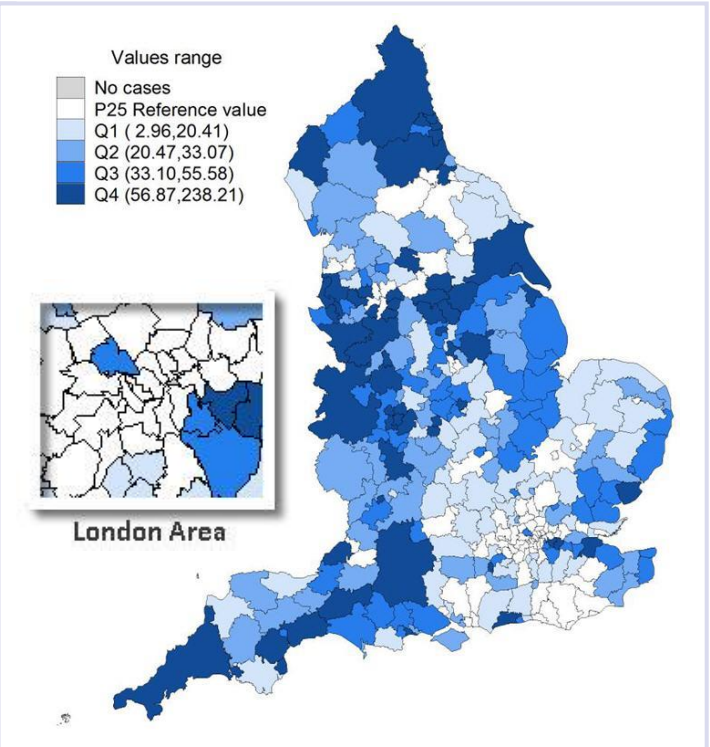


Figure 23. Excess cases Hysterectomy without uterus cancer diagnosis per Local Authority. Scenario II minimisation to p25. 326 Local Authorities. Year 2009

** The darker the blue the larger the difference between the observed number of cases and the benchmark (expected number of cases if they behaved as those Local Authorities with the lowest utilisation rates –p10 and p25). Local Authorities are clustered into 5 quintiles according to their level of excess cases (Q1 to Q5). –legend provides the range within each quintile.*

Aggregated at Regional level, West Midlands and North West show the larger potential for avoiding excess-cases, in the range of 1800 interventions per year, far from London that remains in the area of 300 excess lower-value hysterectomies per year *(figure 25; see figure 24 for the less conservative estimations)*

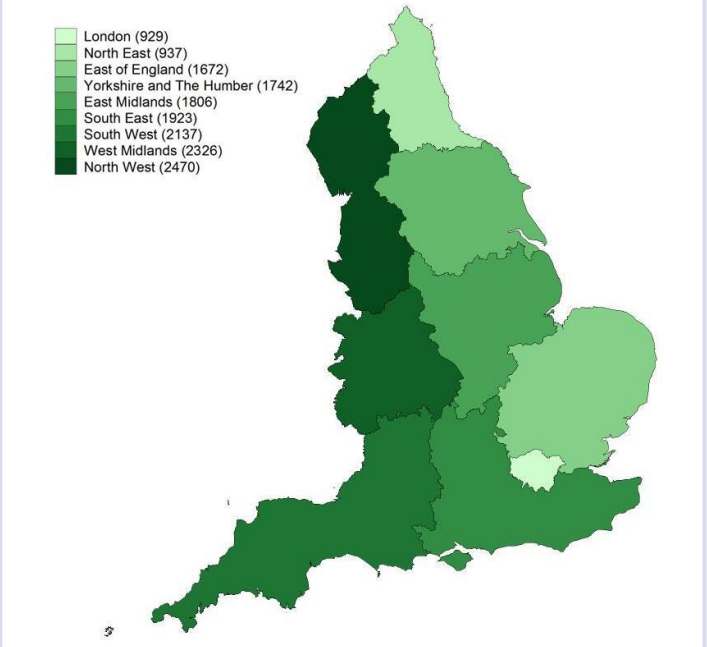


Figure 24. Excess cases Hysterectomy without uterus cancer diagnosis. Scenario I minimisation to p10. 9 regions. Year 2009

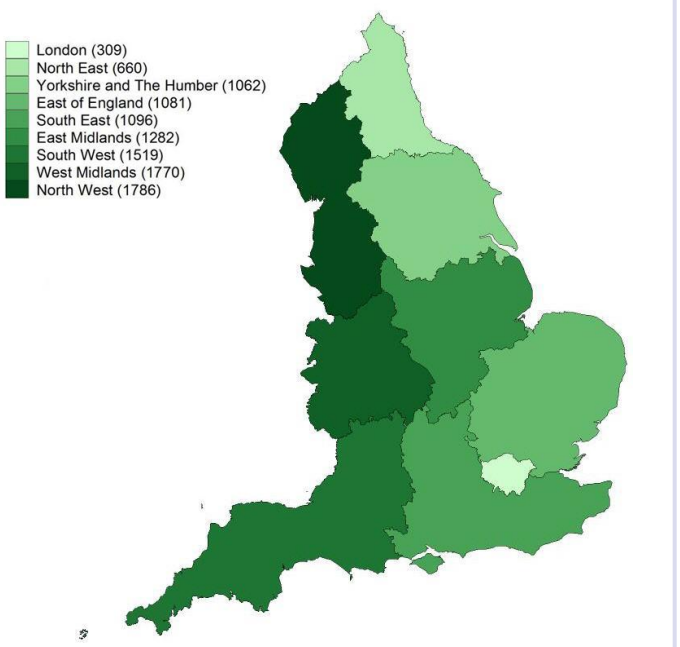


Figure 25. Excess cases Hysterectomy without uterus cancer diagnosis. Scenario II minimisation to p25. 9 regions. Year 2009

** The darker the green the larger the number of excess-cases estimated at region level, if all the local authorities behaved as the benchmark of minimal utilisation –p10 and p25 -, legend provides values for each region.*

Non conservative surgery in breast cancer

The current therapeutic approach for breast cancer includes surgery, often followed by hormonal therapy and radiotherapy. Surgical treatment can be conservative (CS), which preserves part of breast glandular tissue, or non-conservative treatment (NCS) which entails total removal of breast glandular tissue, maintaining or not the skin tissue. Different studies show equal effectiveness for both surgical strategies in terms of long-term survival. However CS is recommended, at any stage of breast cancer on the basis of less complications and better quality of life, confining the use of NCS to those situations where the tumour's size relative to total breast mass prevents conservative resection. In specialised breast cancer centres, approximately 75 percent of women with early stage breast cancer are candidates for breast conserving therapy and 50 to 75% of them would prefer the conservative

approach. Thus, in most situations, NCS is considered lower-value care as it has been superseded by the conservative alternative.

The previous section on international comparison highlighted how England shows the second highest NCS utilisation rate across ECHO countries, figure 26 shows how the national rate pas out onto individual LAs.

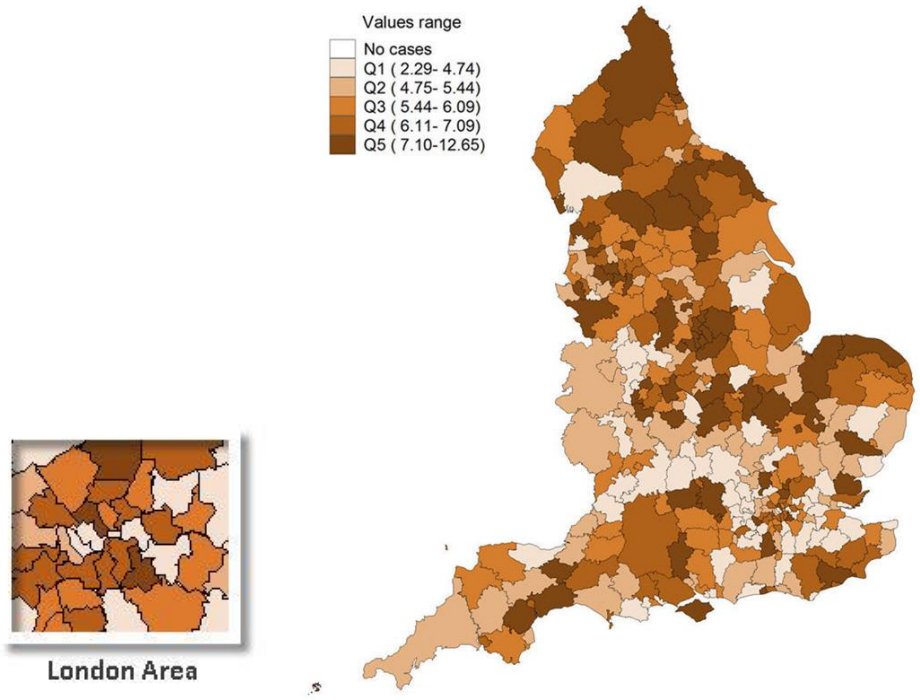


Figure 26. Age-standardised Non conservative surgery in breast cancer utilisation rate per 10,000 women.
326 Local Authorities. Year 2009

** The darker the brow shade, the higher the exposition to non conservative surgery of women living there. Local Authorities are clustered into 5 quintiles according to their rate value (Q1 to Q5). –legend provides the range of standardised rates within each quintile.*

The range of age-standardised rates across the country is considerable: depending on their LA of residence, women face up to a 2-fold difference in the probability of undergoing lower-value breast surgery *(Table 2 appendix 2)*. However only 3% of this variation exceeds what could be randomly expected, and the GOR where the LA belongs explains just 8% of it. Therefore, the exposure across Local authorities seems to be quite homogeneous and the small variation detected stems mainly from local arrangements.

The analysis at regional level points out North East and North West regions, with the highest NCS utilisation rate, though the range of variation across GOR is limited to one point per 10,000 women.

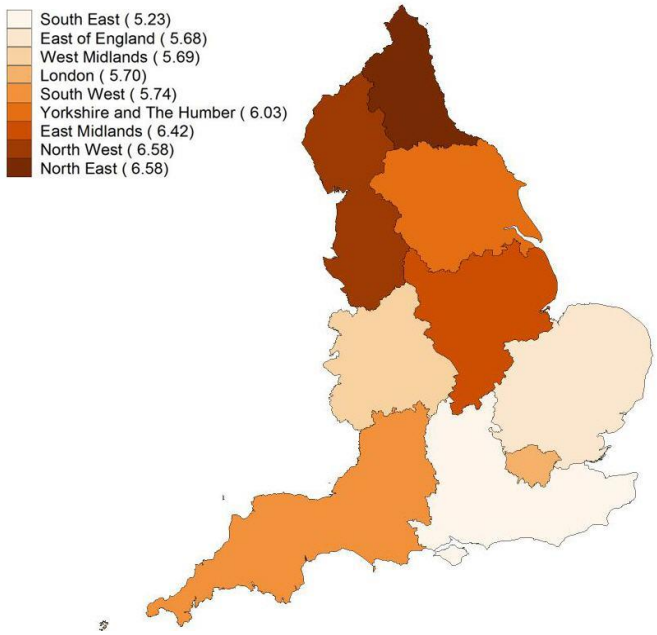


Figure 27. Age-standardised Non conservative surgery in breast cancer utilisation rate per 10,000 women. 9 regions. Year 2009

An estimation of the local potential for minimising the utilisation of NCS shows that, conditional on how strict the benchmark set *(figures 28.a and b)*, women are bearing between 1 and 105 excess interventions in a year, depending on their LA of residence. The same analysis performed at regional level *(figures 29.a and b)* yields an excess NCS in the North West in the area of 750 to 980, while the North East moves around 300 excess lower-value interventions per year. Overall the number of excess non-conservative surgeries in England would be ranging between 4000 and 5500 in a year.

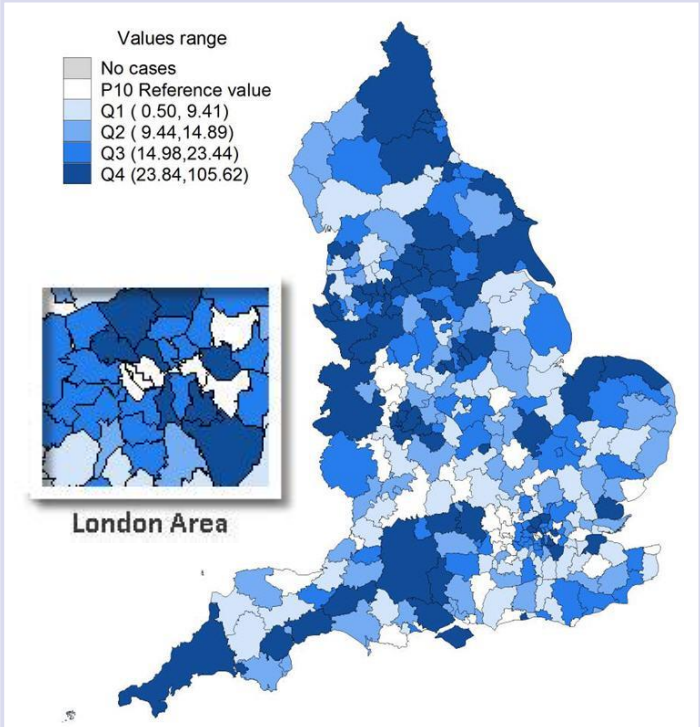


Figure 28.a. Excess cases Non conservative surgery in breast cancer. Scenario I minimisation to p10. 326 Local Authorities. Year 2009

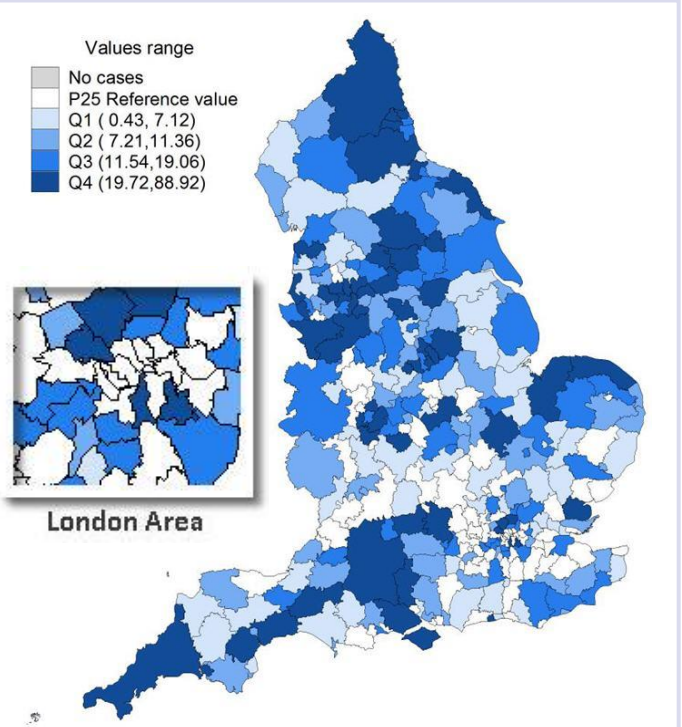


Figure 28.b. Excess cases Non conservative surgery in breast cancer. Scenario II minimisation to p25. 326 Local Authorities. Year 2009

** The darker the blue the larger the difference between the observed number of cases and the benchmark (expected number of cases if they behaved as those Local Authorities with the lowest utilisation rates –p10 and p25). Local Authorities are clustered into 5 quintiles according to their level of excess cases (Q1 to Q5). –legend provides the range within each quintile.*

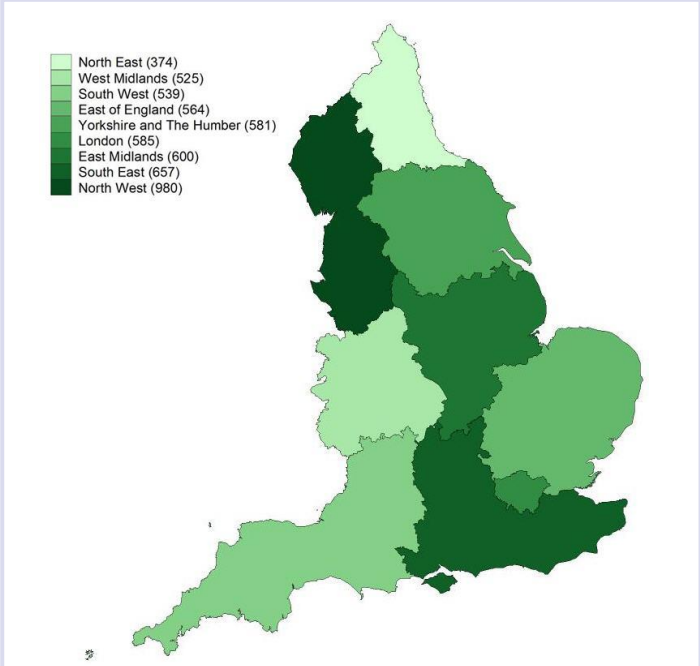


Figure 29.a. Excess cases Non conservative surgery in breast cancer. Scenario I minimisation to p10. 9 regions. Year 2009

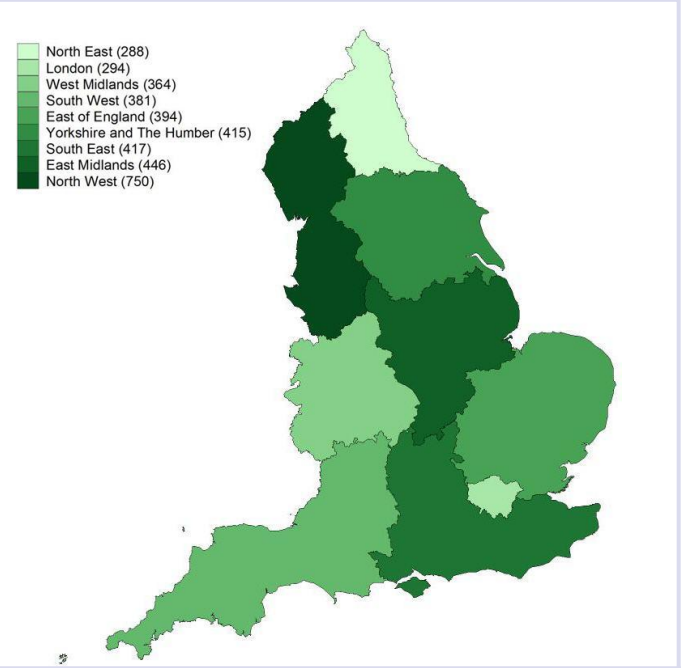


Figure 29.b. Excess cases Non conservative surgery in breast cancer. Scenario II minimisation to p25. 9 regions. Year 2009

** The darker the green the larger the number of excess-cases estimated at region level, if all the local authorities behaved as the benchmark of minimal utilisation –p10 and p25 -, legend provides values for each region..*

Prostatectomy in benign prostatic hyperplasia

Open prostatectomy is the oldest surgical method to treat heavily symptomatic benign prostatic hyperplasia (BPH). This method is still preferred if the prostate is very large but, in general terms, it has been superseded by less invasive interventions, such as transurethral resection of the prostate (TURP) and should be considered lower-value care. However, there is growing evidence on overuse of surgical options (specially those less invasive) in dealing with BPH and, in particular, misuse in asymptomatic or minor cases.

Compared to the other ECHO countries, England shows moderate prostatectomy rate in BPH (see section II). Variation within the country is relevant, though, covering an array from 1 in 3368 men to 1 in 313, depending on the LA of residence *(Fig. 30 and Table 2, appendix 2)*. This means that men living in a top utilisation LA (95th percentile) are bearing 4 times more chances to get their prostate removed than those residents at the bottom end (5th percentile). Such differences are hardly amenable to differences in need.

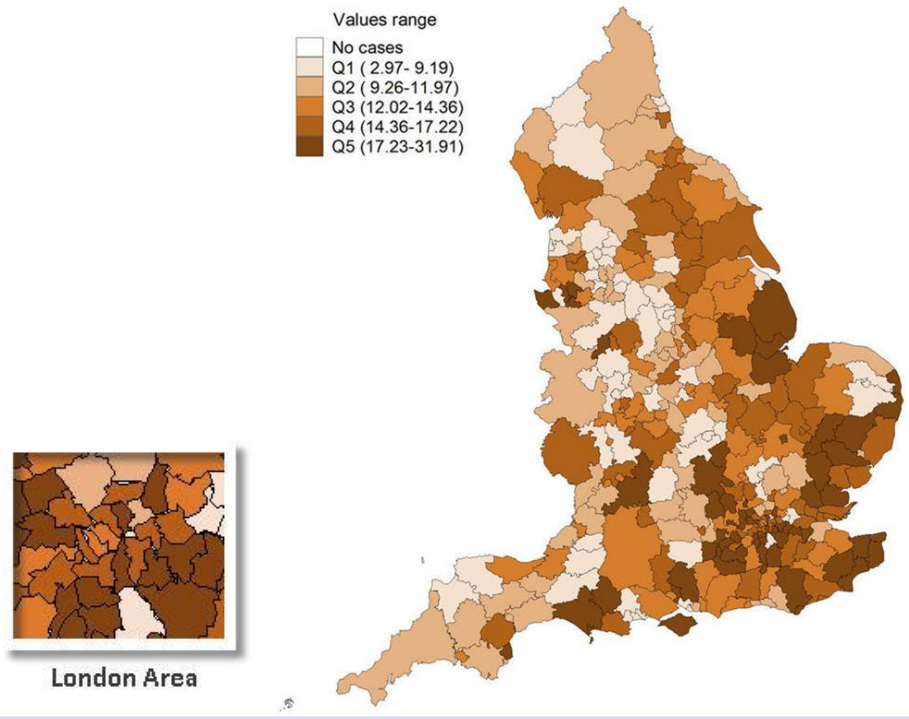


Figure 30. Age-standardised Prostatectomy in benign prostatic hyperplasia utilisation rate per 10,000 male aged 40 or older. 326 Local Authorities. Year 2009

** The darker the brown shade, the higher the exposition to prostatectomy of men living there. Local Authorities are clustered into 5 quintiles according to their rate value (Q1 to Q5). –legend provides the range of standardised rates within each quintile.*

In addition, 14% of this variation exceeds what could be randomly expected; also, it seems to not to be entirely amenable to factors operating within the LA, since the regional level explains 15% of such variability *(Table 2, Appendix 2)*.

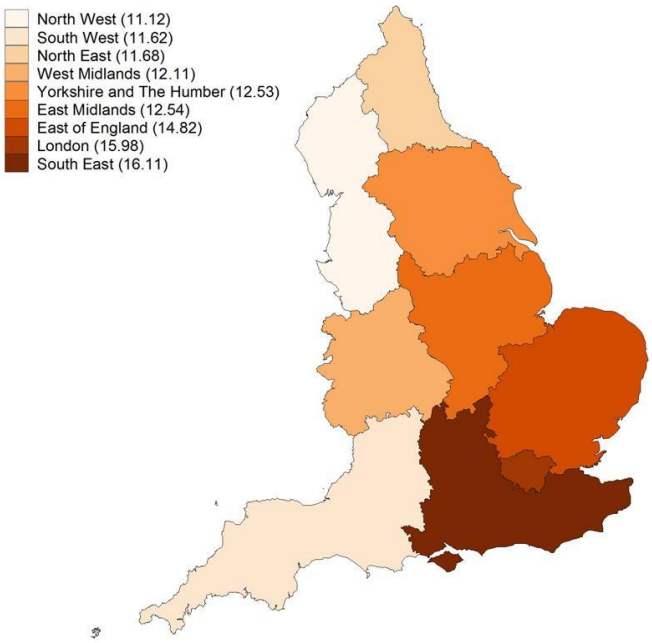


Figure 31. Age-standardised Prostatectomy in benign prostatic hyperplasia utilisation rate per 10,000 male aged 40 or older. 9 regions. Year 2009

The estimation of excess cases in a year per LA (figures 32.a and b) shows how, if all areas were to converge to the lowest utilisation rate in the country (either the behaviour across the lowest 25% or 10%), the number of interventions that could be avoided in a year would range from 2-3, for the LAs already in lower utilisation intensity, to 99-134 for those more prone to use it.

The estimations at regional level for both scenarios yield a minimum 225 excess interventions in North East, up to more than 2000 in South West. Overall, some 6700 to 8900 excess-interventions in a year at country level, depending on the minimising scenario (*appendix 2, Tables 3 and 4)*.

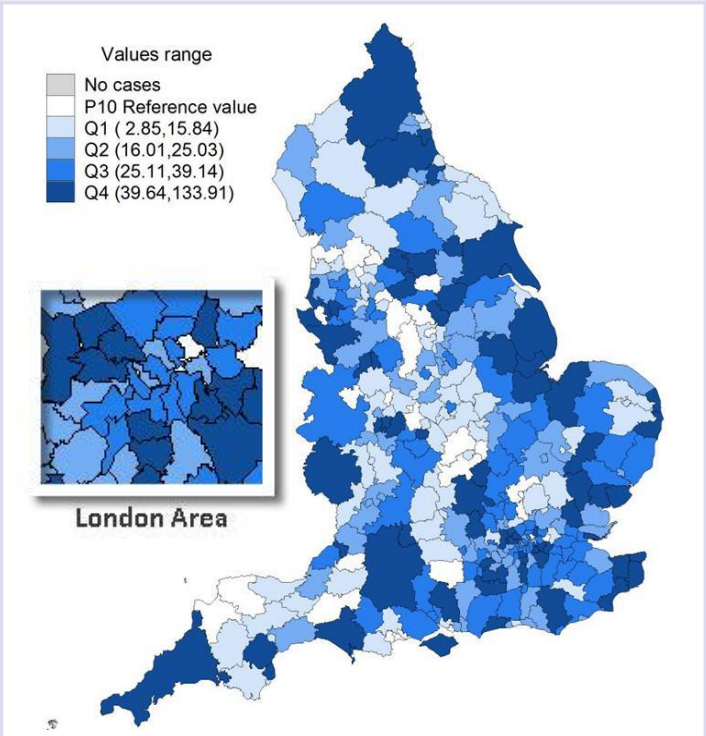


Figure 32.a. Excess cases Prostatectomy in benign prostatic hyperplasia per Local Authority. Scenario I minimisation to p10. 326 Local Authorities. Year 2009

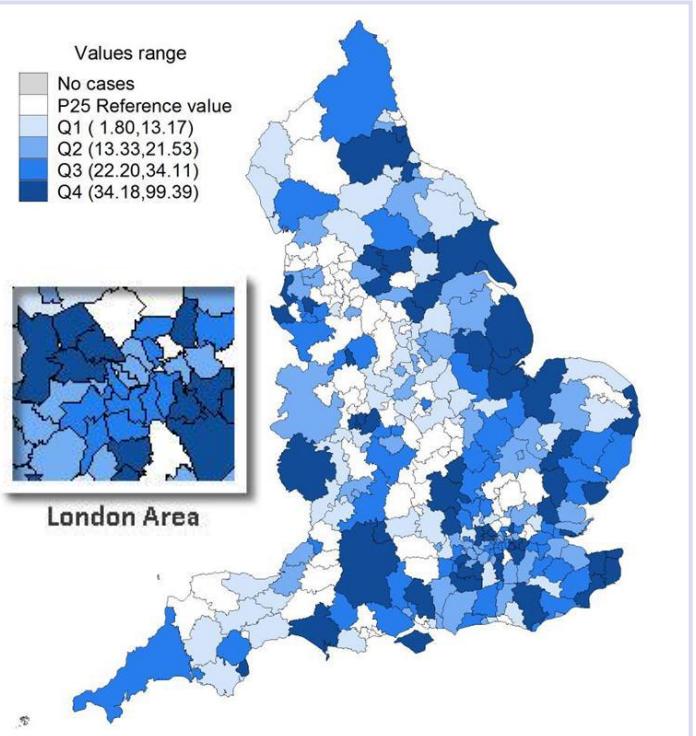


Figure 32.b. Excess cases Prostatectomy in benign prostatic hyperplasia per Local Authority. Scenario II minimisation to p25. 326 Local Authorities. Year 2009

** The darker the blue the larger the difference between the observed number of cases and the benchmark (expected number of cases if they behaved as those Local Authorities with the lowest utilisation rates –p10 and p25). Local Authorities are clustered into 5 quintiles according to their level of excess cases (Q1 to Q5). –legend provides the range within each quintile.*

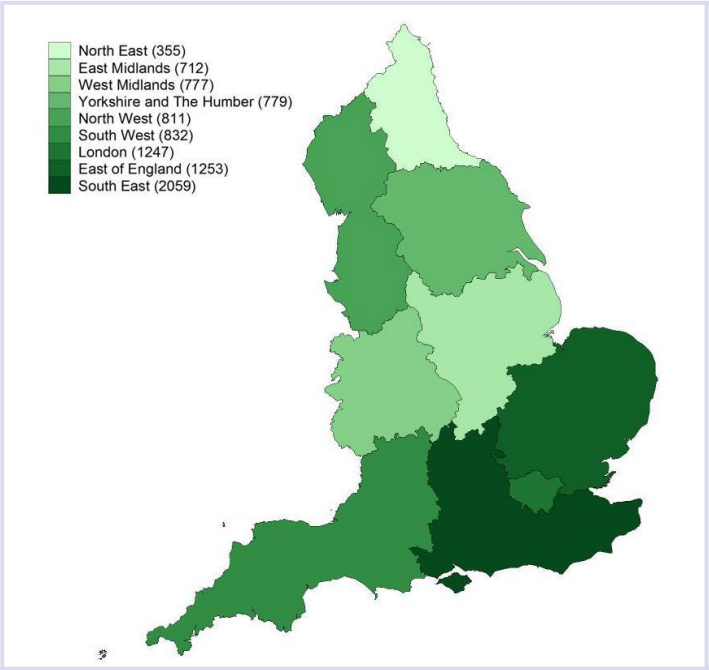


Figure 37.a. Excess cases Prostatectomy in benign prostatic hyperplasia. Scenario I minimisation to p10. 9 regions. Year 2009

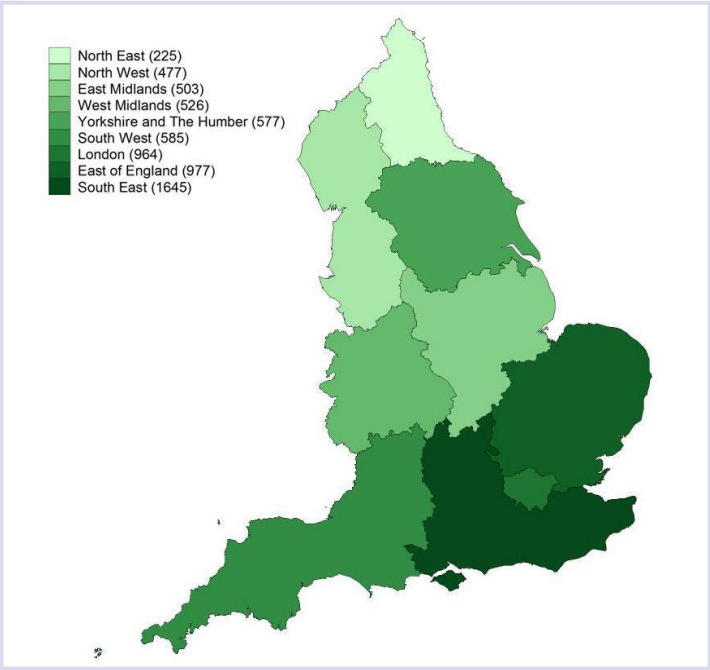


Figure 37.b. Excess Prostatectomy in benign prostatic hyperplasia. Scenario II minimisation to p25. 9 regions. Year 2009

** The darker the green the larger the number of excess-cases estimated at region level, if all the local authorities behaved as the benchmark of minimal utilisation –p10 and p25 - legend provides values for each region.*

Both LVC utilisation rates and the degree of systematic divergence in exposure to it, depending on the local authority of residence, have experienced only slight changes.

IV. EVOLUTION OVER TIME

Between 2002 and 2009, utilisation rates of lower-value care in England show a remarkably steady line with no major changes (*Fig. 39, see also Tables 5 to 9 in Appendix 2)*.

A slight decrease can be observed for adeno and/or tonsillectomy and c-section in low risk births; in the first case, there has been also a decrease in systematic variation; that is, by the end of the period, adeno/tonsillectomy rate was 9% smaller, while the difference across LAs not amenable to chance had been reduced by 4 percentage points. The decrease in utilisation of lower-value c-section amounted to some 7% with more or less the same degree of systematic variation.

English men's chances of undergoing a lower-value prostatectomy experienced an 11% reduction, but, the variation amenable to their LA of residence remained around 14% for the whole period.

Non-oncologic Hysterectomy has shown no changes, either in the utilisation rate or its degree of systematic variation across LAs.

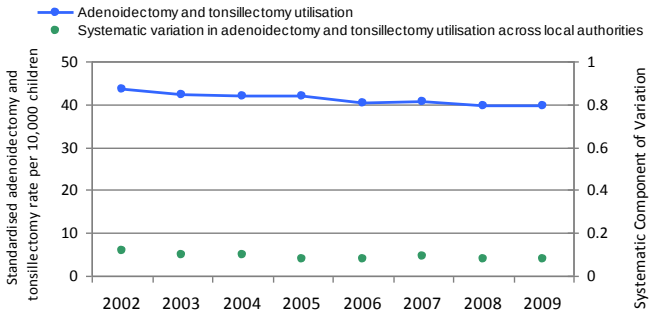
Overall Utilisation of NC breast surgery showed a tiny increase as from 2006, with very a small reduction in the already low variation across LAs

Graphs in this section provide information on two issues: the evolution of the utilisation rate (blue lines representing the standardised rate) and the evolution of the non-random variation (green dots representing the systematic component of variation), over time.

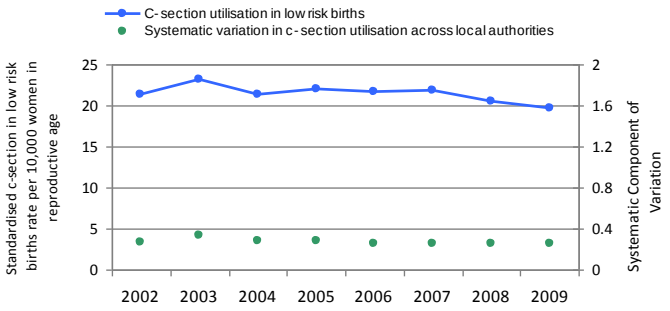
We should look first at the utilisation trend –upwards would mean bad evolution, regardless how variation had changed. The desirable change would be a simultaneous decline in utilisation and variation.

A decrease in utilisation concurrent with larger variation entails more divergence in local behaviours, i.e. certain populations are systematically more exposed to lower-value care, which, in turn, warrants the identification and specific targeting of those LAs more deviant from the desirable minimal utilisation.

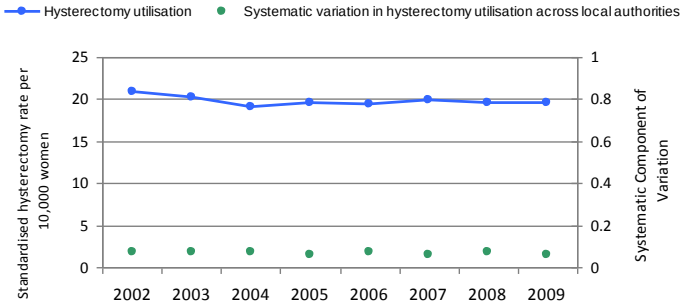
Adenotonsillectomy



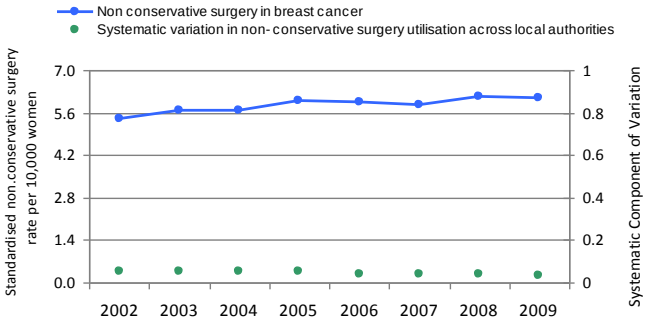
Cesarean section in low risk deliveries



Hysterectomy



Non conservative surgery in breast cancer



Prostatectomy in benign prostatic hyperplasia

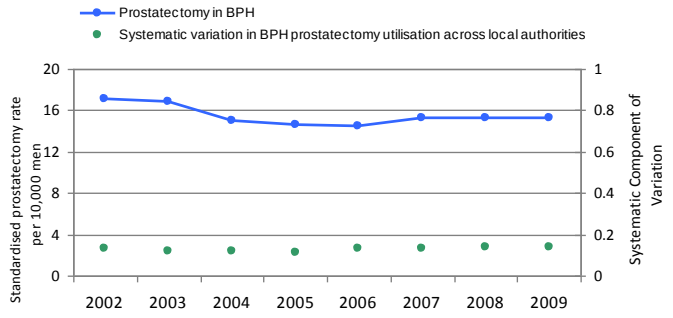


Figure 39 . Evolution of standardised rates (blue lines) and systematic variation (green dots) over time

Individual trends for Local Authorities at both extremes of lower-value care utilisation (2002 –2009)

The insights drawn from overall trends in utilisation rate and systematic variation can be complete by looking at the individual behaviour of LAs over the period of analysis.

This section offers only a few selected examples, but Individual local authorities' evolution over time can be tracked in their original dynamic charts at

http://www.echo-health.eu/handbook/quintiles_lvc_eng.html

Besides the specific examples of change in intensity of lower-value care use, it is also relevant to consider the spread of bubbles in 2009. Since they all started at the same utilisation quintile in 2002, the variety of colours they have taken up by the final year (one for each quintile of utilisation intensity), provides a flavour of how inveterate might be the medical practice underpinning such utilisation and how homogeneous or diversely shaped over time and across local authorities.

As mentioned above, English adeno/tonsillectomy rate has slightly decreased and so has its systematic component of variation. Figure 40.a tracks two LAs ranking as good performers at the beginning of the period (among the 20 % lowest rates per 10,000 children in the country -quintile 1); however, their behaviour starts diverging as from 2004: children in Sheffield have seen their probability of receiving the intervention increased while their fellows' in Croydon even dropped; despite having started at the same level of utilisation, they end up at opposite ends of the range. Figure 40.b portraits the same phenomenon, but for bad performers, i.e. LAs at the top quintile of utilisation range in 2002.

The resulting array of bubbles in 2009 shows how about half of the LAs starting in quintile 1 have tended to escalate their utilisation level by one or two quintiles; likewise, half of those already starting in the upper utilisation level have remained at the same intensity, while the other half have moved one or two quintiles down, though they rarely go below quintile 3.

For c-section in low risk births, the majority of those LAs at the bottom level of intensity has remained below quintile 3, while those in the upper bound have spread covering the whole range of utilisation quintiles.

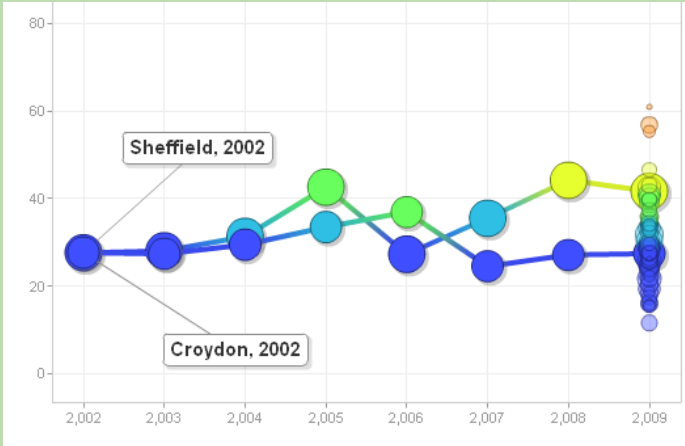


Figure 40.a. Trends in adeno/tonsillectomy. Q1

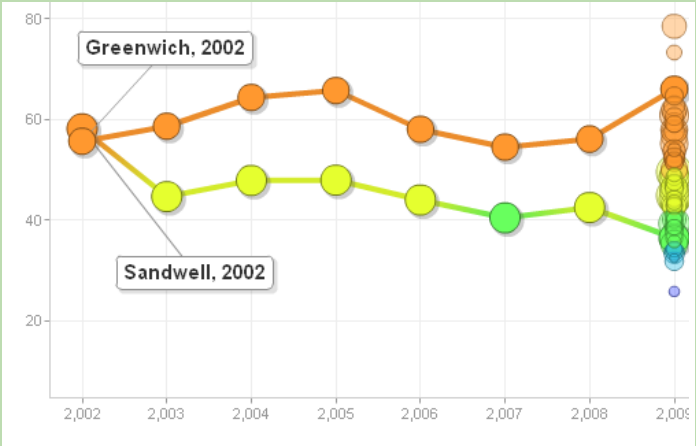


Figure 40.b. Trends in adeno/tonsillectomy. Q5

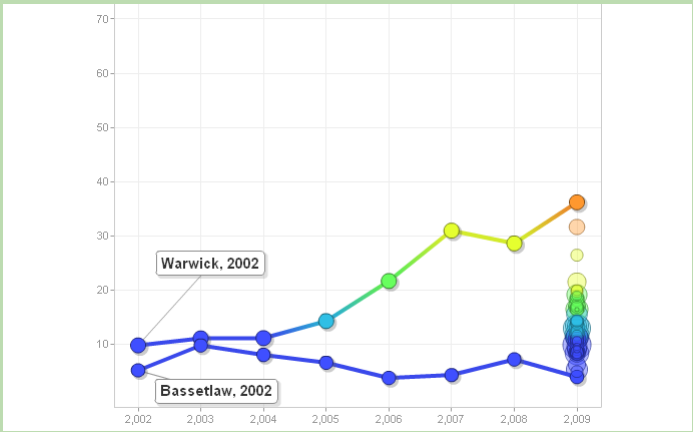


Figure 41.a. Trends in C-section in low risk deliveries. Q1

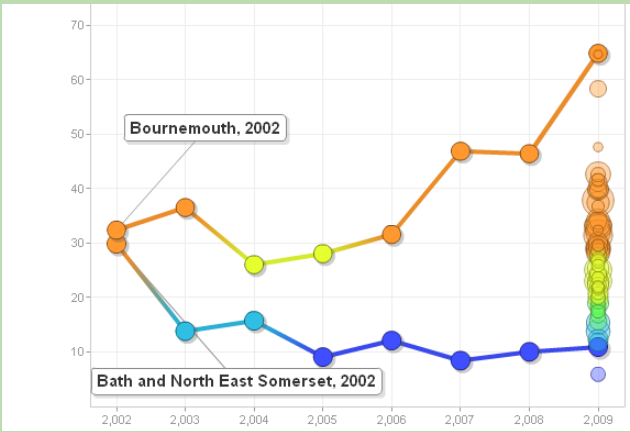


Figure 41.b. Trends in C-section in low risk deliveries. Q5

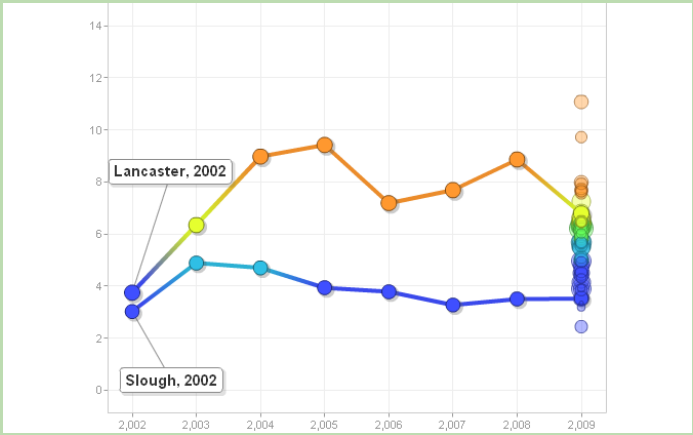


Figure 42.a. Trends in non-conservative cancer breast surgery. Q1

Figure 42.b. Trends in non-conservative cancer breast surgery. Q5

** All figures chart Standardised utilisation rates per 10,000 and time in years. Bubbles represent individual Local Authorities, the size being proportional to population. Colours reflect a ranking of utilisation: Q5 corresponds to the highest quintile of utilisation, Q1 the lowest. Bubbles change colour over time according to the changes in their relative intensity of use compared to the others (quintile of utilisation); the absolute value of the standardised rate each year is marked by the position in y-axis. The array of bubbles represented on 2009 reflects only those Local Authorities which in 2002 where in the same utilisation quintile as the two tracked in the figure.* Q1 Q2 Q3 Q4 Q5

The same is true for those areas at both ends of utilisation rates of NCS in breast cancer, by the end of the period they had stretched along the full array of intensity quintiles; it is worth noting, though, the number of LAs originally in the higher quintiles which shifted to the lowest quintile of use for this procedure.

LAs at the lower end of hysterectomy utilisation in non-oncologic conditions at the beginning of the period are remarkably prone to remain at the same level of intensity by 2009; some of them have escalated their utilisation level by one or two quintiles. However, those already starting in the upper utilisation level had spread evenly along all levels of utilisation by 2009

Looking at the evolution of Prostatectomy in BPH rate, the majority of low use LAs (quintile 1) in 2002 has tended to remain as such or moved just one quintile upwards by 2009; however, those starting in quintile 5 have shifted more often, with about half of them decreasing their intensity of use by 2 or even 3 quintiles (Figures 44.a and b)

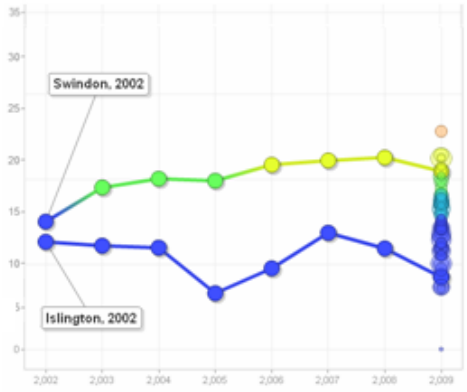


Figure 43.a. Trends in hysterectomy non-oncologic. Q1

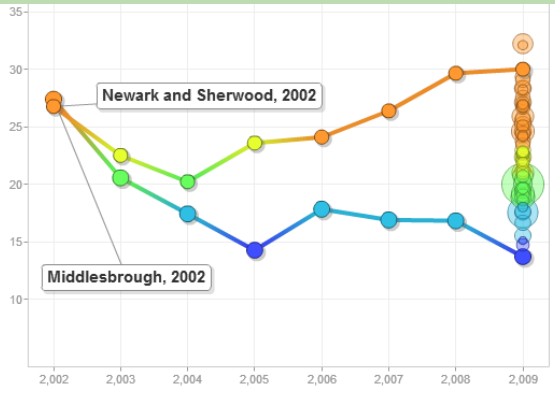


Figure 43.b. Trends hysterectomy non-oncologic. Q5

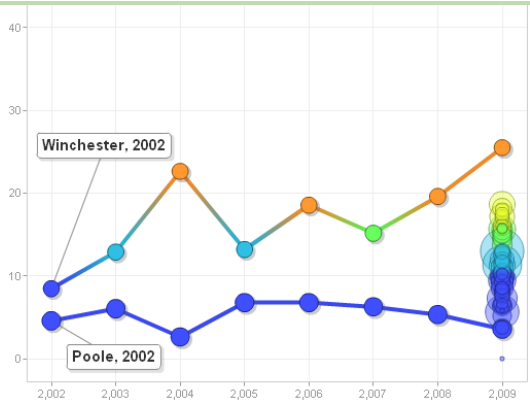


Figure 44.a. Trends in Prostatectomy in benign prostate hyperplasia. Q1

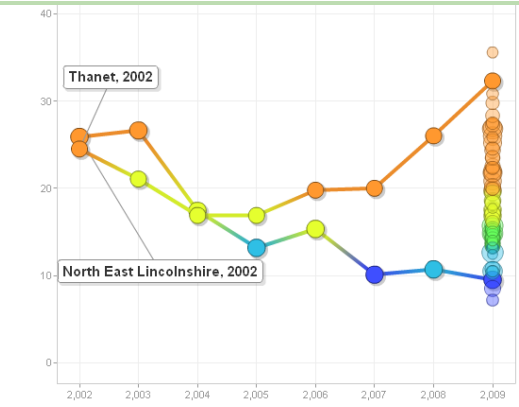


Figure 44.b. Trends in Prostatectomy in benign prostate hyperplasia. Q5

** All figures chart Standardised utilisation rates per 10,000 and time in years. Bubbles represent individual Local Authorities, the size being proportional to population. Colours reflect a ranking of utilisation: Q5 corresponds to the highest quintile of utilisation, Q1 the lowest. Bubbles change colour over time according to the changes in their relative intensity of use compared to the others (quintile of utilisation); the absolute value of the standardised rate each year is marked by the position in y-axis. The array of bubbles represented on 2009 reflects only those Local Authorities which in 2002 where in the same utilisation quintile as the two tracked in the figure.* Q1 Q2 Q3 Q4 Q5

V. SOCIAL GRADIENT

The distribution of lower-value care utilisation seems to be quite homogeneous across different quintiles of LA wealth. The only exception regards children exposure to adeno/tonsillectomy and women's to non-oncologic hysterectomy. In both cases, populations living in the most deprived quintile of LAs bear significantly higher chances of receiving lower-value care *(Figure 45)*.

As for children, the gap between wealthy and deprived LAs has remained constant over the period of analysis (around 10 utilisation points higher for the worse-off areas, i.e. about 30% higher rates)

The trend for non-oncologic hysterectomy differs in that the gap decreases over time, with utilisation in worse-off LAs decreasing to match that in wealthier areas until they converge by the end of period.

Regarding c-section (both total and in low risk cases), although there is a clear pattern of higher rates among women living in deprived areas, these differences have proven no statistically significant over the period of analysis.

Prostatectomies in BPH and NCS in breast cancer behave similarly in their distribution across quintiles of deprivation: differences are small and positions switch over time, but no significant differences are detected over time.

LVC utilisation rates are compared across local authorities clustered into quintiles of average income level. Each line in the graphs corresponds to one of those quintiles.

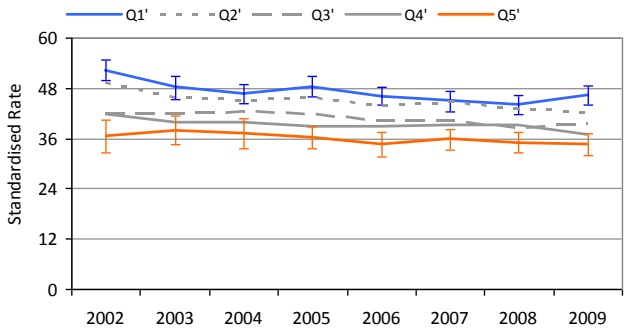
The wider the gap between most and least affluent quintile lines, the more inequitably distributed the exposure to low value care will be. Such eventual gap could be widening, narrowing or maintained over time.

Besides the relative position of the lines over time, it is relevant to keep track of the 95% confidence intervals (whiskers drawn around annual rate) for quintiles 1 and 5. Only those not overlapping represent a statistically significant difference between wealthier and deprived areas.

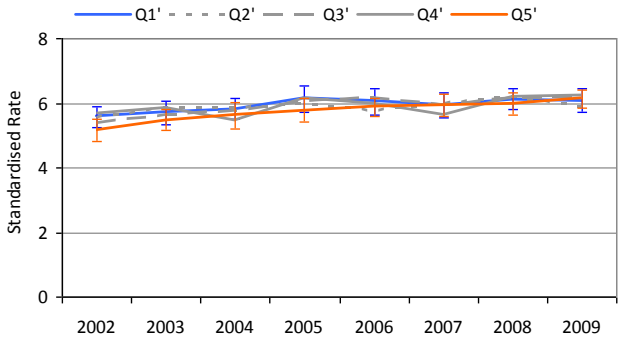
The desirable pattern will show no statistically significant differences across local authorities amenable to their wealth. If such differences were present, a positive time trend will consist in progressively narrowing the gap till, eventually, disappearing.

However, given the nature of the type of care examined, a concern about the direction of convergence is due. The suitable evolution should tend to minimise lower-value care provision for all levels of wealth. Horizontal equity at high levels of lower-value care utilisation could hardly be considered a good performance sign.

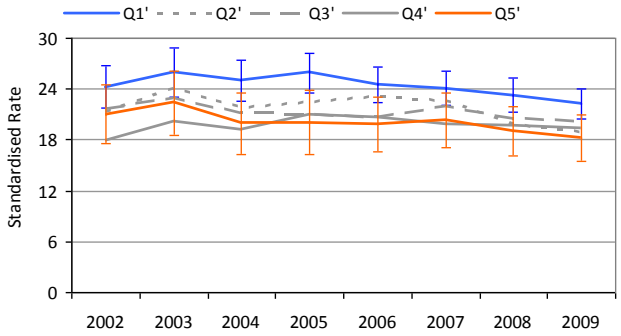
Adenotonsillectomy



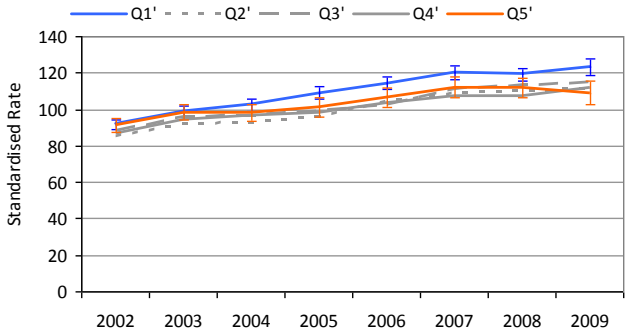
Non-conservative breast cancer surgery



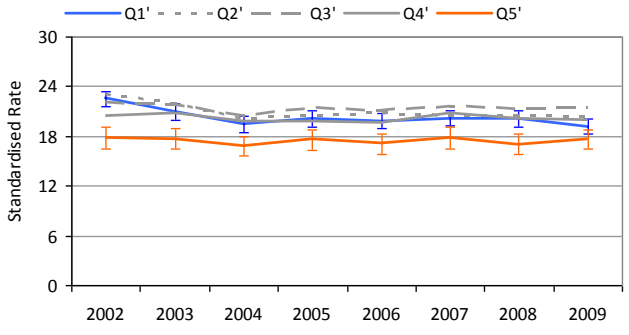
c-section low risk deliveries



Total c-section



Hysterectomy non oncologic conditions



Prostatectomy in benign prostatic hyperplasia

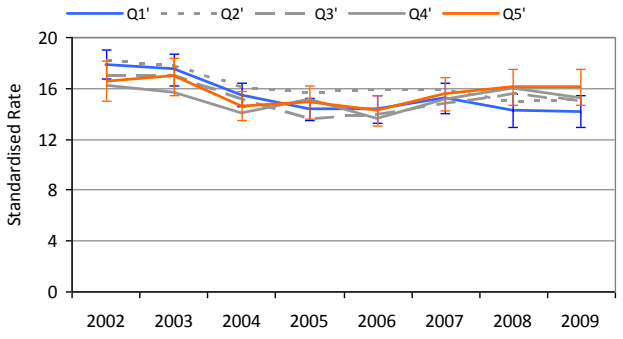


Figure 45 Over time evolution of LVC utilisation rates per quintiles of Local Authority average deprivation score (Q1 = deprived; Q5 =wealthy)

VI. POLICY IMPLICATIONS

The conceptual framing of the analysis presented above is pretty simple: utilisation of lower-value care entails a loss of value-for-money in the health system (allocation of resources that leads to lower quality and safety of care i.e. inefficiency). Typically, these phenomena occur at local level, giving way to differential exposure or access to services depending on the place of residence (often coined as *"post-code lottery").*

The analysis yields two types of knowledge useful for action: on the one hand, it quantifies the magnitude of the problem, setting it in reference to other relevant European countries; on the other, it actually identifies those areas within the country with higher potential for realignment into value-based provision of care on the basis of national benchmarks (less prone to cultural and organisational biases, so relevant in this cluster of care)

The 2 scenarios of minimising use of LVC are somewhat arbitrary. They are only intended to provide some reasonable reference for the potential for improvement on the basis that, when it comes to lower-value care, *the lesser the better.* Overall, the minimisation of use of the 5 LVC procedures examined is worth almost 50,000 excess-interventions in a year for the conservative scenario and 65,000 in the drastic one. The estimation is summarised in the following table:

	Estimated excess-interventions in a year	
LVC procedures	Conservative p25	Drastic p10
Adeno and/or tonsillectomy	13585	17543
C-section in LRD	13939	17479
Hysterectomy non-oncologic	11241	16156
NC breast cancer surgery	3963	5455
Prostatectomy BPH	6698	8887
Total	49,426	65,520

Policy-wise, the key will lay in understanding the situation in local authorities to appropriately tailor any intervention aimed at limiting the use of lower-value care. Factors that had been often highlighted as underpinning these phenomena, and maybe worth analysing in England, include:

- Local schools of practice that lead to well established clinical styles that may involve lower-value care. Learning cascades and the leadership of prestige figures play a paramount role here.
- The lack of clinical guidelines has been reported as fostering utilisation of low-value care. But also existing clinical guidelines/protocols locally or regionally issued should be analysed. They could weight in two opposite directions:
    - Perfectly adequate guidelines may have no impact on clinical practice if they are not binding and/or the general perception is that they lack legitimacy to meddle with daily practice. This could be either because the recommended courses of action are not locally available -no contextualising effort is acknowledged- or, simply, because professionals had felt excluded from the elaboration and, thus, do not accept them as relevant
    - Local protocols of care for certain conditions may have adapted to limited availability of cost-effective conservative alternatives, consolidating certain practice styles. Such alternatives often involve more intense follow-up and consultation and/or co-adjuvant therapies, which may be more difficult to display in certain settings, such as disperse populations entailing considerable, direct and indirect, travel costs.
- Since all the procedures analysed can be considered “elective” surgery, patient’s preferences could be most relevant. The choice or acceptance of lower-value care might stem from insufficient, and even inadequate, information about consequences and alternative courses of action. This eventual misinformation has been often reported, particularly in relation to prostatectomy and c-section. Patients’ empowerment and adequate exposure to complete information may change their views.

- Commissioning guidelines targeted to Local authorities, issued by the Audit Commission, or, more recently, to the Clinical Commissioning groups supported by programmes such as “Right Care”, may have also had an impact in reducing the utilisation of LVC. This type of analysis could help to unveil and monitor such effect if extended beyond 2009.

The analysis conducted, suggests that there is plenty of room for enhancing value for money. Although England shows average rates compared with the other ECHO countries, LVC utilisation have tended to remain unchanged over the period of analysis and relatively homogeneous across the country.

Since the main driver seems to reside at local level, focusing on local practices (particularly learning cascades and established medical practice styles), together with patient information and empowerment in decision making, will potentially have a major impact.

Further analysis on institutional factors underpinning overuse of LVC at Local Authority level, as well as organisational and budgetary local contexts, will serve as basis for recommendations to guide relevant decision makers in enhancing allocative efficiency.

SAVINGS ARE NOT WARRANTED, the aim is fostering “value for money” i.e. avoid non-efficient public expenditure

APPENDIX 1:

Tables International Comparison 2009

Table 1. Summary Utilisation rates and statistics of variation per country 2009 per indicator

	Adeno/tonsillectomy children up to 14 years old				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	3261	37301	9597	2354	30076
Stand. Rate	33.38	39.75	62.29	83.67	53.93
EQ5-95	3.86	2.50	3.42	2.46	4.80
SCV	0.21	0.09	0.34	0.66	0.23

	C-section in low-risk deliveries				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	5356	26982	1140	1106	9287
Stand. Rate	43.41	20.30	4.32	21.81	8.95
EQ5-95	2.29	4.51		3.51	49.44
SCV	6.34	0.80	0.69	0.81	0.47

	Hysterectomy non-oncologic conditions				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	4897	39948	9166	1568	24367
Stand. Rate	21.84	19.01	21.44	18.18	14.77
EQ5-95	1.98	2.27	1.83	2.34	2.95
SCV	0.14	0.07	0.09	0.04	0.09

	Non-conservative surgery breast cancer				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	2187	15472	2746	490	8821
Stand. Rate	8.14	6.22	5.24	5.00	4.31
EQ5-95	1.93	1.90	2.32	3.96	3.77
SCV	0.56	0.10	0.04	0.06	0.07

	Prostatectomy benign prostatic hyperplasia				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	2330	16197	3120	458	16422
Stand. Rate	22.09	15.04	12.73	12.53	18.20
EQ5-95	4.38	3.33	3.94	6.37	4.13
SCV	0.47	0.10	0.18	0.23	0.18

sR: Age-sex Standardised Rate per 10,000 inhabitants (Reference population: ECHO countries 2009); EQ: Extremal Quotient; SCV:Systematic Component of Variation;

APPENDIX 2:

Tables England 2009

Table 2. LVC procedures standardised utilisation Rates per 10,000 and statistics of variation in England, year 2009

	Adenotonsillectomy	C-section Low Risk Delivery	Hysterectomy Non-oncologic condition	Non-conservative Surgery breast cancer	Prostatectomy benign prostatic hyperplasia
Cases	37,301	26,982	39,948	15,472	16,197
Population	9,075,704	14,026,014	21,863,226	26,295,170	12,099,465
Crude Rate	40.21	18.55	18.87	6.05	13.74
Stand. Rate	40.38	19.55	18.62	5.85	13.69
sR Min.	10.89	0.6	6.77	2.29	2.97
sR Max.	83.59	67.45	31.19	12.65	31.91
sR. P5	22.83	7.95	11.25	3.57	6.01
sR. P25	31.7	12.37	15.24	4.99	10.02
sR. P50	39.57	17.94	18.49	5.81	12.85
sR. P75	48.57	23.64	21.48	6.64	16.82
sR. P95	61.68	37.26	26.52	8.17	24.18
EQ5-95	2.7	4.69	2.36	2.29	4.03
EQ25-75	1.53	1.91	1.41	1.33	1.68
SCV	0.08	0.26	0.06	0.03	0.14
ICC	0.05	0.06	0.27	0.08	0.15

** sR: Age-sex Standardised Rate per 10,000 inhabitants (Reference population: national); sR Px: percentile x of sR distribution; EQ: Extremal Quotient;*

APPENDIX 2:

Tables England 2009

Table 3. Excess-cases (Observed-Expected) of lower-value care in England, year 2009, conservative scenario (benchmark the 25 percent of Local Authorities with the lowest standardised utilisation rate)

	Adenoton sillectomy	C-section Low Risk Delivery	Hysterectomy Non-oncologic condition	Non-conservative Surgery breast cancer	Prostatectomy benign prostatic hyperplasia
Total EC25	13585	13939	11241	3963	6698
EC25 min	1	1	1	1	1
EC25 max	240	364	238	89	99
Q1	650	547	661	255	411
Q2	1748	1571	1703	662	1007
Q3	3150	2908	2851	955	1824
Q4	8037	8913	6026	2091	3456

**EC25:Excess number of cases using as benchmark percentile 25 of the distribution of standardised utilisation rate per Local Authority (observed-expected); Qx: quartile of the EC25 distribution;*

Table 4. Excess-cases (Observed-Expected) of lower-value care in England, year 2009, drastic scenario (benchmark the 10 percent of Local Authorities with the lowest standardised utilisation rate)

	Adenoton sillectomy	C-section Low Risk Delivery	Hysterectomy Non-oncologic condition	Non-conservative Surgery breast cancer	Prostatectomy benign prostatic hyperplasia
Total EC10	17543	17479	16156	5455	8887
EC10 min	1	1	1	1	1
EC10 max	290	403	331	106	134
Q1	996	805	1129	436	637
Q2	2349	2013	2516	999	1487
Q3	4183	3735	4116	1243	2385
Q4	10015	10926	8395	2777	4378

** EC10:Excess number of cases using as benchmark percentile 10 of the distribution of standardised utilisation rate per Local Authority (observed-expected); Qx: quartile of the EC10 distribution;*

APPENDIX 3:

Tables England Evolution over time 2002-2009

Table 5

	Adenotonsillectomy							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	41202	39622	38960	39545	37509	37898	37111	37301
Stand. Rate	43.65	42.32	41.79	41.89	40.1	40.55	39.48	39.51
sR Q1.	52.21	48.19	46.62	48.42	46.08	44.88	43.94	46.20
sR Q5.	36.53	37.89	37.11	36.28	34.60	35.76	35.03	34.57
SCV	0.12	0.1	0.1	0.08	0.08	0.09	0.08	0.08

** sR: Age-sex Standardised Rate per 10,000 inhabitants (Reference population: national 2002); sR Qx: quintile of sR distribution; SCV:Systematic Component of Variation;*

Table 6

	C-section Low Risk Delivery							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	30998	32733	30327	30945	30104	30005	27953	30998
Stand. Rate	21.32	23.18	21.4	21.96	21.63	21.79	20.44	19.68
sR Q1.	24.26	25.91	24.98	25.90	24.56	24.11	23.25	22.20
sR Q5.	21.04	22.35	19.93	20.08	19.89	20.38	19.06	18.19
SCV	0.27	0.33	0.28	0.28	0.26	0.25	0.26	0.26

** sR: Age Standardised Rate per 10,000 inhabitants (Reference population: national 2002); sR Qx: quintile of sR distribution; SCV:Systematic Component of Variation;*

Table 7

	Hysterectomy Non-oncologic condition							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	43136	41957	39147	40197	39844	40745	40258	39948
Stand. Rate	20.89	20.31	19.12	19.63	19.47	19.87	19.59	19.54
sR Q1.	22.57	20.96	19.43	20.07	19.81	20.16	20.16	19.19
sR Q5.	17.79	17.68	16.80	17.60	17.08	17.74	17.03	17.66
SCV	0.07	0.07	0.07	0.06	0.07	0.06	0.07	0.06

** sR: Age Standardised Rate per 10,000 inhabitants (Reference population: national 2002); sR Qx: quintile of sR distribution; SCV:Systematic Component of Variation;*

APPENDIX 3:

Tables England Evolution over time 2002-2009

Table 8

	Non-conservativeSurgery breast cancer							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	13971	14530	14631	15246	15142	15056	15277	15472
Stand. Rate	5.44	5.71	5.71	6.01	5.96	5.9	6.13	6.11
sR Q1.	5.57	5.70	5.82	6.13	6.04	5.93	6.12	6.08
sR Q5.	5.16	5.48	5.61	5.77	5.88	5.94	5.98	6.14
SCV	0.05	0.05	0.05	0.05	0.04	0.05	0.04	0.03

sR: Age Standardised Rate per 10,000 inhabitants (Reference population: national 2002); sR Qx: quintile of sR distribution; SCV:Systematic Component of Variation;

Table 9

	Prostatectomy benign prostatic hyperplasia							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	18536	18292	16150	15747	15520	16326	16294	16197
Stand. Rate	17.18	16.98	15.04	14.71	14.45	15.32	15.38	15.27
sR Q1.	17.87	17.45	15.47	14.30	14.32	15.17	14.26	14.16
sR Q5.	16.57	16.93	14.60	14.88	14.22	15.53	16.07	16.10
SCV	0.13	0.13	0.12	0.11	0.13	0.13	0.15	0.14

** sR: Age Standardised Rate per 10,000 inhabitants (Reference population: national 2002); sR Qx: quintile of sR distribution; SCV:Systematic Component of Variation;*

APPENDIX 4:

Technical note

Utilisation of lower-value care is measured as geographical indicators within the ECHO performance model.

This fact entails some implications, both for methodology and in interpreting results. The report is based on ecologic analyses –data aggregated at a certain geographical level which becomes the unit of analysis for this report; thus, the correct interpretation of the findings highlights the risk of being exposed to lower-value care for the population living in a certain area (as opposed to the risk for an individual patient).

Main endpoints:

This report maps out standardised utilisation rates per geographical area. As a summary measure of variation, the report includes the classical statistics Ratio of Variation between extremes and Component of Systematic Variation. The other variable consistently mapped out through the report is the excess cases per area in two scenarios of minimised utilisation

When burden of disease or activity calibrators were available, the report has also included their standardised utilization rates and ratios

Instruments:

Being an ecologic study, each admission was allocated to the place of residence of the patient, which, in turn, was referred to a policy relevant geographic unit – the 326 Local Authorities and the 9 Government Offices for Regions building up the English National Health System over the period analysed.

The operational definitions for each indicator are detailed in the coding table in appendix 4. Indicators are based on those in use in the international arena. For its use in the analysis of variations across countries they were subject to a construct validity process developed by the Atlas VPM project in Spain and the cross-walking across different disease and procedures classifications underwent a face-validation carried out as a task within the ECHO project.

This report is based on the hospital admissions registered in the Hospital Episode Statistics (HES). Cross- and within-country sections were built upon 2009 discharges, whereas time-trends and social gradient analyses used 2002 to 2009 data.

Social gradient data were obtained from the UK National Statistics official data for LAs on average annual income deprivation (people in households on low income benefits).

APPENDIX 5:

Definitions of indicators

	Diagnosis codes ICD10 and Procedures codes OPCS					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Non-conservative surgery in breast cancer Women	C50 D05 Z85.3				B27	
Prostatectomy in prostate cancer Male population aged 40 or older	C61 D07.5 D09.9 D40.0				M61, M62, M65, M67, M71	
Prostatectomy in benign prostatic hyperplasia Male population aged 40 or older	N40 D29.1				M61, M62.1, M62.2, M62.8	
Births with complications (CB) Women Aged between 15 and 55	O44 O45 O46 O47 O48 O11 O14 O15 O23 O300 O301 O302 O308 O32 O34 O43 O364 O362 O420 O756 O611 O610 O753 O321 O648 O345 O640 O660 O661 O664 O665 O658 O669 O632 O690 O691 O710 O711 O713 O290 O291 O750 O751 O830 O291 O987 O641		O44 O45 O46 O47 O48 O11 O14 O15 O23 O300 O301 O302 O308 O32 O34 O43 O364 O362 O420 O756 O611 O610 O753 O321 O648 O345 O640 O660 O661 O664 O665 O658 O669 O632 O690 O691 O710 O711 O713 O290 O291 O750 O751 O830 O291 O987-O641			

	Diagnosis codes ICD10 and Procedures codes OPCS					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Cesarean section rate Women Aged between 15 and 55 years old					R17, R18	R12, R14, R15, R19, R20, R21, R22, R23, R27, R03.1, R03.2; R03.8; R03.9
Cesarean section rate in low risk deliveries Women Aged between 15 and 55 years old		O987 O11 O14 O15 O23 O290 O291 O291 O300 O301 O302 O308 O32 O321 O34 O345 O362 O364 O420 O43 O44 O45 O46 O47 O48 O610 O611 O632 O64.1 O640 O648 O658 O660 O661 O664 O665 O669 O690 O691 O710 O711 O713 O750 O751 O753 O756 O830		O987 O11 O14 O15 O23 O290 O291 O291 O300 O301 O302 O308 O32 O321 O34 O345 O362 O364 O420 O43 O44 O45 O46 O47 O48 O610 O611 O632 O64.1 O640 O648 O658 O660 O661 O664 O665 O669 O690 O691 O710 O711 O713 O750 O751 O753 O756 O830	R17, R18	R03.1, R03.2; R03.8; R03.9
Hysterectomy in uterus cancer (CB) Women	C53 C54 C55 D06		C53 C54 C55 D06		Q07, Q08	

	Diagnosis codes ICD10 and Procedures codes OPCS					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Hysterectomy without uterus cancer diagnosis Women Aged 18 or older		Cancer in female genital organs or uterus. Abdominal trauma (Appendix 7) O00-O99		Cancer in female genital organs or uterus. Abdominal trauma (Appendix 7) O00-O99	Q07, Q08	
Adenoidectomy and/or Tonsillectomy Population Aged 14 and younger					E20.1, F34.1, F34.2, F34.3, F34.4, F34.7, F34.8, F34.9, F36.1	