ECHO

EUROPEAN COLLABORATION FOR HEALTHCARE OPTIMIZATION

Lower Value Care in Spain

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 insight 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: adenoidectomy and/or tonsillectomy, c-section in low risk deliveries, hysterectomy in non-oncologic conditions, non-conservative surgery in breast cancer and prostatectomy in benign prostatic hyperplasia (BPH).

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

- With the exception of adenotonsillectomy and prostatectomy in benign prostatic hyperplasia, utilisation rates of lower-value care in Spain are relatively low compared to other ECHO countries. In terms of volume, adenotonsillectomy and hysterectomy in non-oncologic conditions seem to be the most relevant.

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- Those superseded by more cost-effective alternatives (non-conservative breast cancer surgery, Hysterectomy in non-oncologic conditions);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 overuse (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 two scenarios of "minimisation of Lower-value Care use":

1. All the areas in the country behave as those in percentile 10th of LVC utilisation (90% of areas will exhibit rates above that threshold).
2. All the areas in the country behave as those in the first quartile of LVC utilisation (75% of areas will exhibit rates above that threshold).

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

- Though variation is significant for all LVC procedures examined, ranging from 3 to 35-fold difference; the systematic component of variation is relevant for certain ones, such as c-section in low risk deliveries with 1.26 times more variation than would be expected by chance, or adenotonsillectomy and prostatectomy in BPH exceeding in 21 and 18% the variation deemed random. In turn, the behaviour across areas of the other procedures seems to be more homogeneous, with a bare 8 to 11% of the observed variation above what would be expected by chance.

- Non-conservative breast surgery and prostatectomies in benign hyperplasia utilisation rates have tended to be stable, slightly decreasing over the period of analysis (2002-2009). A bit more substantial was the 21% decrease in hysterectomy in non-oncologic conditions and the 23% increase in adenotonsillectomies. Additionally, c-section use in low risk deliveries showed an irregular profile over time, although with a net increase of 7%.

- The systematic variation across healthcare areas has not suffered great changes either and in most conditions stayed at moderate levels over time. It is worth noting that variation not deemed random in c-section use in low risk deliveries was extremely high, exceeding by far what would be expected by chance. This, together with the distinct rates detected across healthcare areas, points out an uneven variation of exposure to this procedure across women residing in different areas.

- The distribution of lower-value care utilisation seems to be quite homogeneous across different quintiles of healthcare area average wealth. Only prostatectomy in BPH surgery showed statistically significant differences between better and worse-off areas: from 2006 to 2009 the rate was significantly higher in wealthier healthcare areas. Thus, for this procedure, higher average income seems to increase exposure to 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, organisation of care paths, or incentives framework, which may affect decisions made at local level. Interestingly, the percentage of variation explained by the region is only 7 to 13 % for c-section in low risk births, adenotonsillectomy and non- conservative surgery in breast cancer; but it goes up to 16% in the case of prostatectomy in benign hyperplasia and 22% for non-oncologic hysterectomy.

- The analysis conducted, suggests that there is still for enhancing value for money in the Spanish system. Although Spain shows relative low rates compared with the other ECHO countries, LVC utilisation have tended to remain unchanged over the period of analysis, as well as variation not deemed random staying at moderate levels, residing the main driver at local level. In spite of this, prostatectomy in BPH high rates and adenotonsillectomy increasing trend would deserve special consideration. Focusing on local practices, particularly learning cascades and established medical practice styles, together with patient information and empowerment in decision-making, and in some specific cases, on regional policies will potentially have a major impact.

- Further analysis on institutional factors underpinning overexposure to LVC at healthcare area 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.

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 Spain 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

Spain shows the third highest age-standardised rate of adenotonsillectomy across ECHO countries (*figure 1a*), around 1 in 185 children below 14 years old underwent the procedure in 2009. This value is about 61% higher than that found in Denmark, the country with the lowest rate where 1 in 300 children were intervened in 2009 *(table 1 in Appendix 1).*

The ratio between the highest and lowest rates in Spain is the highest for ECHO countries: there is about a 5-fold chance of getting the procedure for children living in high rate healthcare areas. Denmark and Portugal go next with differences, larger than 3, while England and Slovenia remain in the area of 2.5-fold probability, comparing children living at high intensity areas to those at low. The systematic component of this variation has proven relevant in all countries examined except England, ranging from 21% to 66 % beyond what would be randomly expected *(figure 1b, see also table 1 in Appendix 1).*

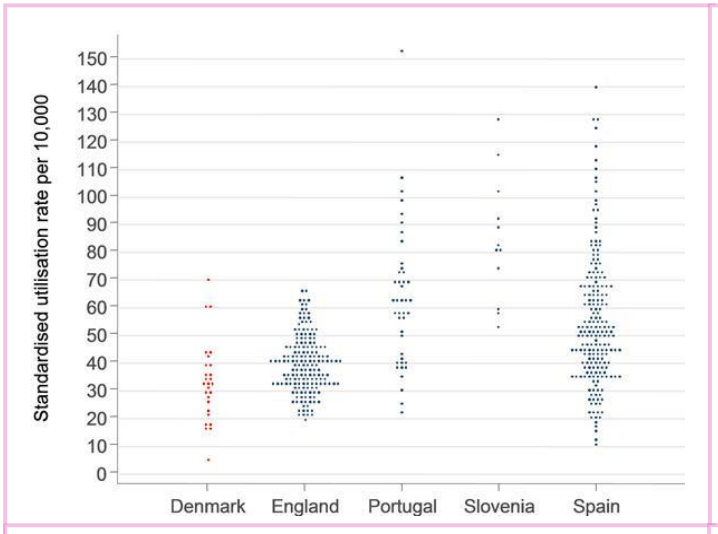


Figure 1a. Standardised rates of adenoidectomy and/or tonsillectomy per 10,000 children (natural scale). Year 2009

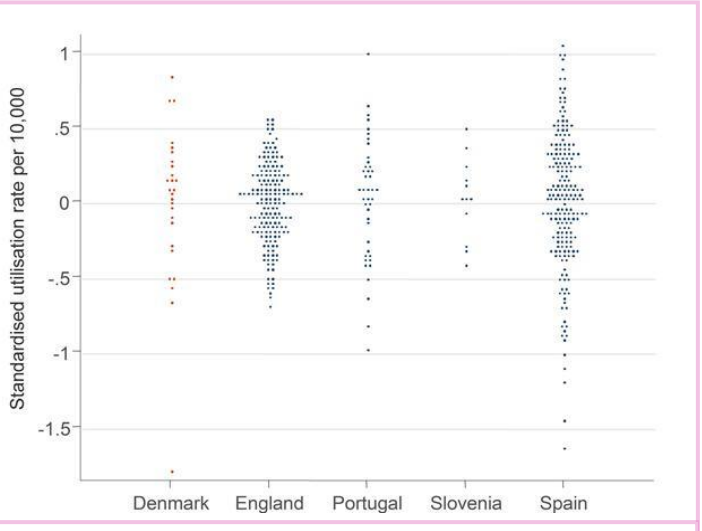


Figure 1b. Standardised rates of adenoidectomy and/or tonsillectomy per 10,000 children (normalised scale). Year 2009

Each dot represents the relevant administrative area in the country (healthcare areas for Spain). The y-axis 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.

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.

Spain, with 9 c-sections in low risk births per 10,000 women in reproductive age, lays at the bottom of the range across ECHO countries. This rate doubles the Portuguese one, halves the English and Slovenian, and is up to 5 times lesser than the Danish rate *(figure 2.a and Table 1 in Appendix 1)*. Interestingly, regardless the size of the rate, variation for this procedure across the territory seems to be remarkable in all countries. In this case, Spanish healthcare areas range between null cases and figures raising close to Danish *kommuners*, as a result the ratio of variation rocketing up to 50 *(figure 2.b)*.

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 *(figure 2. b and table 1 in Appendix 1).*

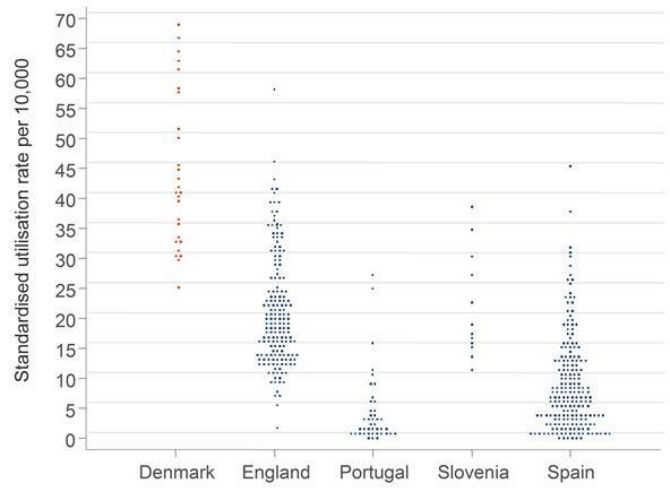


Figure 2a. Standardised Rates of C-Section in low-risk cases per 10,000 women in reproductive age (natural scale). Year 2009

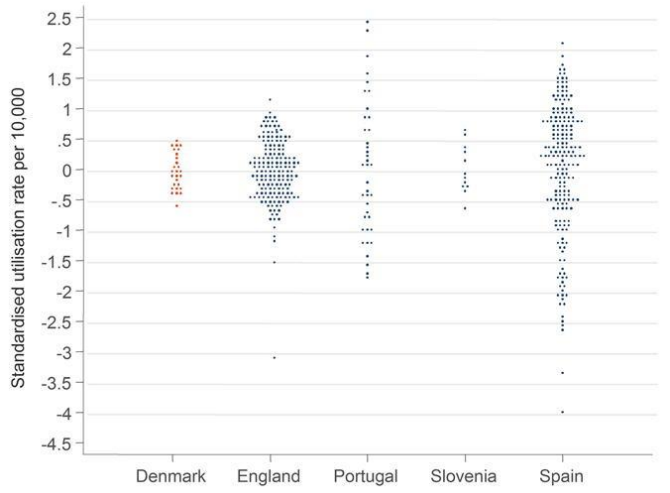


Figure 2b. Standardised Rates of C-Section in low-risk cases per 10,000 women in reproductive age (normalised scale). Year 2009

Each dot represents the relevant administrative area in the country (healthcare areas for Spain). The y-axis 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

Spain shows the lowest rate of hysterectomy in non-oncologic conditions (one in 677 adult women in a year); 48% lower than those found in Denmark- one in 458 women- the country with the highest rate *(figure 3.a and table 1 in Appendix 1)*.

Compared to other cases of LVC presented in this report, the variation of utilisation across countries seems less marked, ranging from 14.8 to 21.8 hysterectomies per 10,000 adult women; likewise, within country variation is smaller than other LVC procedures, though still significant, particularly in Spain, where women face differences close to 3 times, across the territory *(figure 3.b and table 1 Appendix).* However, the systematic component of this variation (variation beyond chance) is low to moderate.

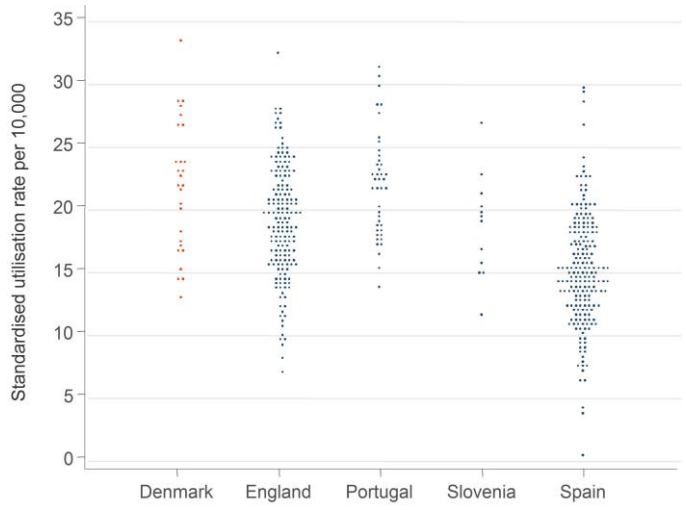


Figure 3a. Standardised Rates of Hysterectomy in non-oncologic conditions per 10,000 women (natural scale). Year 2009

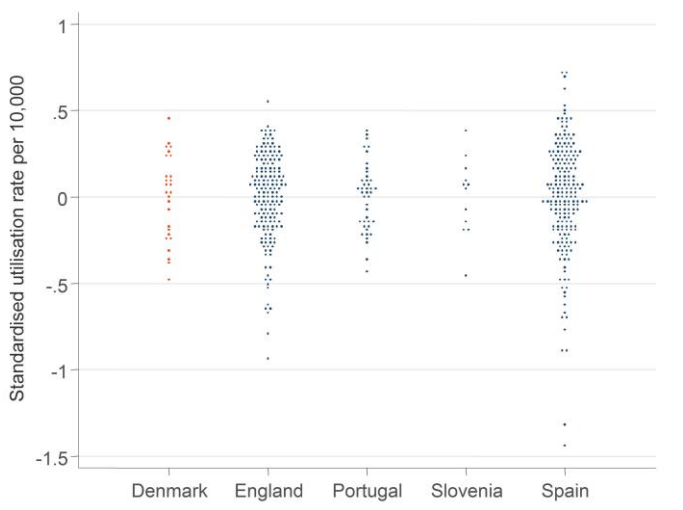


Figure 3b. Standardised Rates of Hysterectomy in non-oncologic conditions per 10,000 women (normalised scale). Year 2009

Each dot represents the relevant administrative area in the country (healthcare areas for Spain). The y-axis 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.

Non-conservative surgery in breast cancer

The rate of non-conservative breast surgery in Spain is the lowest, although aligned with that in Slovenia and Portugal (4.31 per 10,000 women), is far from that in Denmark -8.14 per 10,000 women *(figure 4.a and table 1 Appendix 1)*. In addition, women living in those healthcare areas with the highest rates have close to four times more chances of getting non-conservative surgery than those living at the bottom of the utilisation range; very similar to what happens in Slovenia. In turn, in Portugal, Denmark and England extreme differences are smaller, around twice, depending on the area of residence *(figure 4.b 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 could not be deemed random *(table 1 Appendix 1)*.

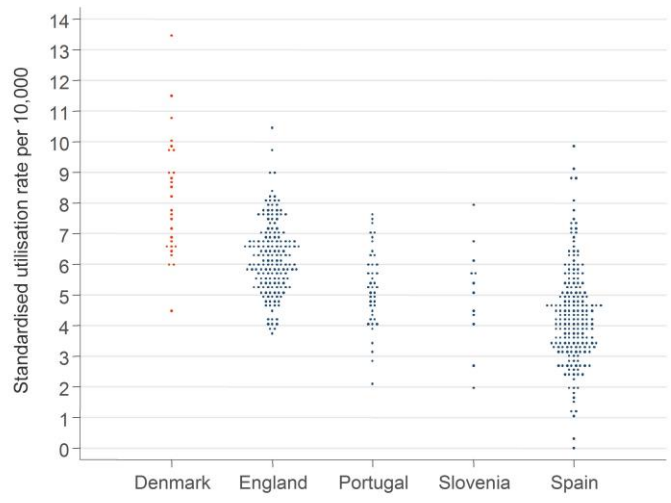


Figure 4a. Standardised Rates of non-conservative surgery in breast cancer per 10,000 women (natural scale). Year 2009

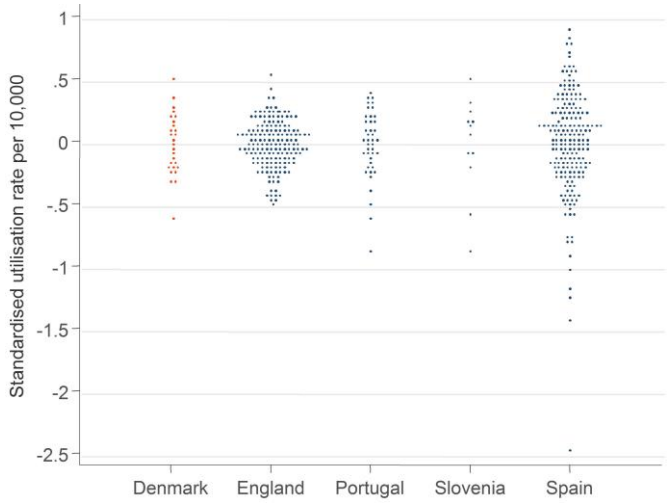


Figure 4b. Standardised Rates of non-conservative surgery in breast cancer per 10,000 women (normalised scale). Year 2009

Each dot represents the relevant administrative area in the country (healthcare areas for Spain). The y-axis 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.

Prostatectomy in benign prostatic hyperplasia

Spain shows, the second highest age-standardised rates of prostatectomy in BPH, 1 intervention in 549 adult men each year, far from the numbers observed in the countries with the lowest rates, Portugal and Slovenia, close to 1 in 800 adult men *(Figure 5a and table 1 Appendix 1)*. Regarding the ratio between extreme areas, Slovenia shows the highest (6-fold difference) followed by Denmark and Spain with adult men living in the highest rate areas bearing 4 times more chances of getting a prostatectomy *(Figure 5b and table 1 Appendix)*. The systematic component of this variation was relevant across all countries examined, ranging from 10 to almost 50%, not amenable to randomness.

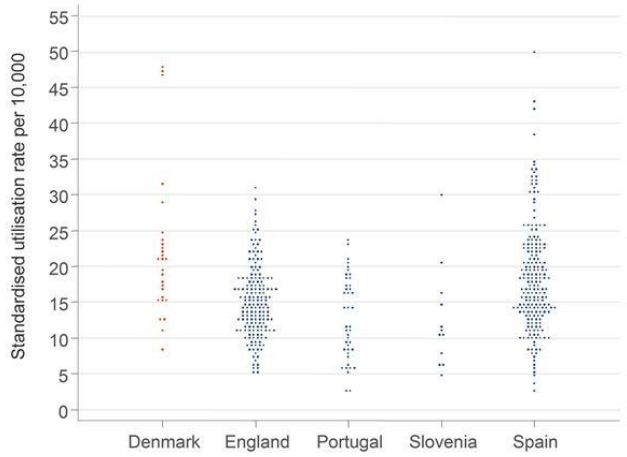


Figure 5a. Standardised Rates of prostatectomy in BPH per 10,000 men (natural scale). Year 2009

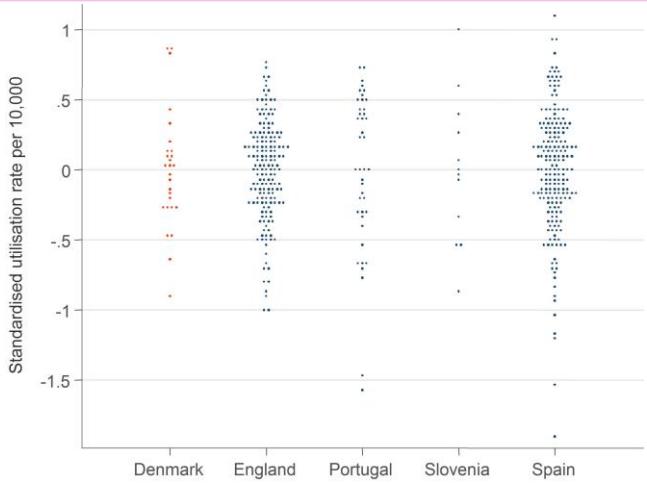


Figure 5b. Standardised Rates of prostatectomy in BPH per 10,000 men (normalised scale). Year 2009

Each dot represents the relevant administrative area in the country (healthcare areas for Spain). The y-axis 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.

III. IN COUNTRY VARIATION

The higher the rate of utilisation of low 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 prostatectomy in benign prostatic hyperplasia (BPH) and adenotonsillectomy, utilisation rates of lower-value care in Spain are relatively low compared to other ECHO countries. In terms of volume, adenotonsillectomy and non-oncologic hysterectomy seem to be the most relevant *(table 2 in Appendix 2)*.

Although variation is significant for all LVC procedures examined -ranging from 3 to 35-fold chances of getting the procedure depending on the healthcare area of residence-, the systematic component is particularly relevant for certain ones, such as c-section in low risk deliveries, adenotonsillectomy or prostatectomy in BPH; for the remaining procedures (i.e. non conservative surgery in breast cancer and hysterectomy in non-oncologic conditions) the behaviour across areas seems to be quite homogeneous.

Along the following pages, the geographical pattern of utilisation for each procedure will be presented, mapping out the two relevant tiers in the Spanish health system organisation: healthcare areas and *Comunidades Autónomas* (also named as Regions).

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 healthcare areas in the 10th percentile of rates distribution (90% of the 199 healthcare areas will be above that threshold); the other scenario, more conservative, benchmarks against the 25% lowest rates in the country (75th of the areas will have higher utilisation).

Variation in utilisation of each LVC procedure is represented using two geographical units: healthcare areas and regions. The first mapping is composed of 199 units and the second comprises 17 regions. Analysis by healthcare areas would be more linked to local medical practices, whilst regions could be considered a surrogate for regional policies affecting all the healthcare areas within.

Adenoidectomy and/or tonsillectomy

These are still very frequent paediatric surgeries, despite their indication being restricted to a relative small fraction of 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). Unwarranted geographical variability has been recorded for these procedures since 1938 to nowadays.

The highest quintile of age-standardised utilisation rates includes healthcare areas ranging between 61 and 113 interventions per 10,000 children while the lowest goes from 7 to 32 (*figure 6*). Variation across areas with extreme rates is considerable -close to 5-fold between percentile 95 and 5th. 21% the variation is beyond that expected by chance (*table 2 in Appendix2*).

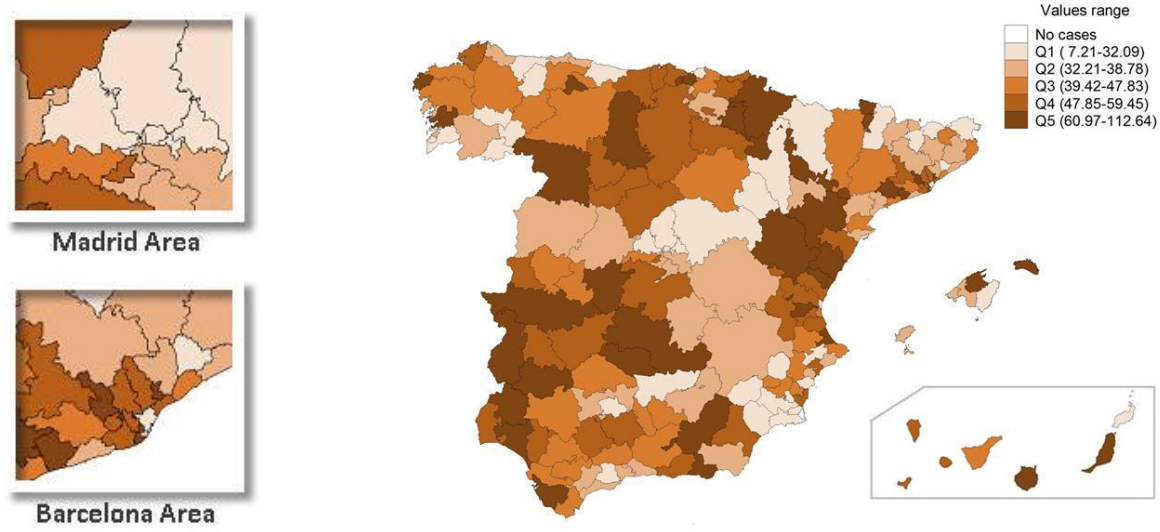


Figure 6. Age-sex standardised adenoidectomy and/or tonsillectomy utilisation rate per 10,000 children up to 14 years old. 199 healthcare areas. Year 2009

The darker the brown the higher the exposure to adenotonsillectomy. Healthcare areas 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 performed by region, Canary Islands, Extremadura and Navarra stand out, followed by Castilla-León, Cantabria and La Rioja. In turn, Madrid, Asturias, Murcia and Balearic Islands show the lowest rates (*figure 7*). The regional level explain 13% of the observed variation, suggesting a minor regional role in this medical practice *(table 2 in Appendix 2).*

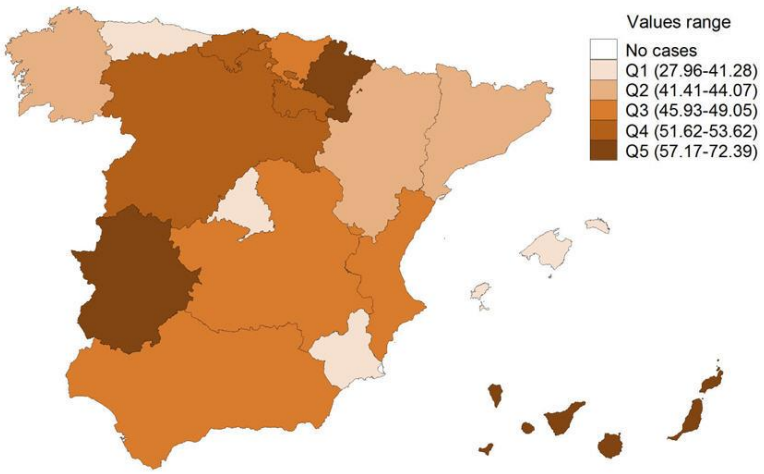


Figure 7. Age-sex standardised adenoidectomy and/or tonsillectomy utilisation rate per 10,000 children up to 14 years old. 17 regions. Year 2009

The larger opportunities for minimising the use of adenotonsillectomy tend to be found where the highest rates were previously detected *(figures 7 and 8)*. In the most conservative scenario, those areas more in need of intervention to decrease utilisation would be performing up to 541 adenoidectomies and /or tonsillectomies in excess per year (633 when using the more demanding benchmark in scenario I). The overall number of excess interventions in the country in 2009 can be conservatively estimated around 13,003 *(table 3 in Appendix 2);* half of them concentrated in Andalucia, Cataluña, Valencia and Canarias regions *(figure 9.b).*

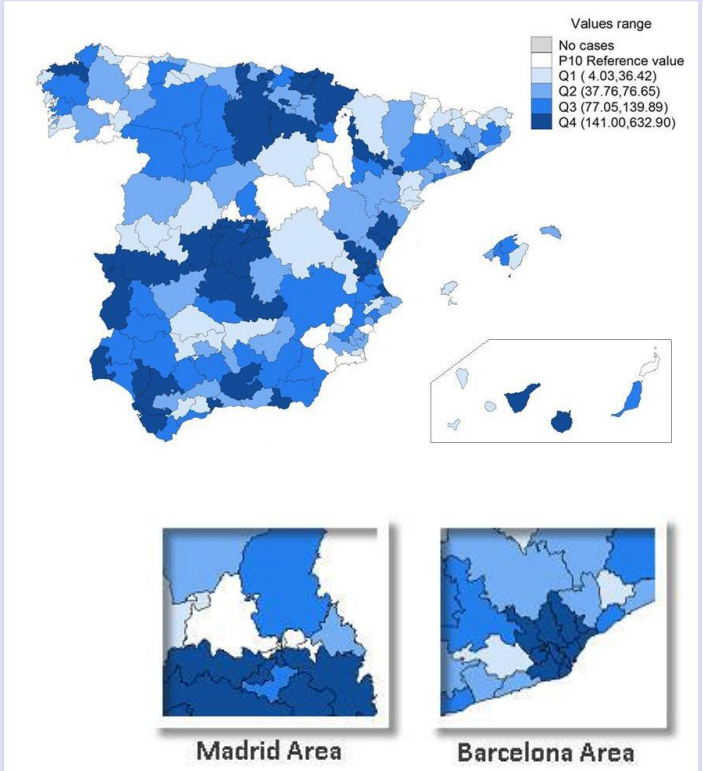


Figure 8.a. Excess cases for adenotonsillectomy per healthcare area. Scenario I: minimisation to p10. 199 healthcare areas. Year

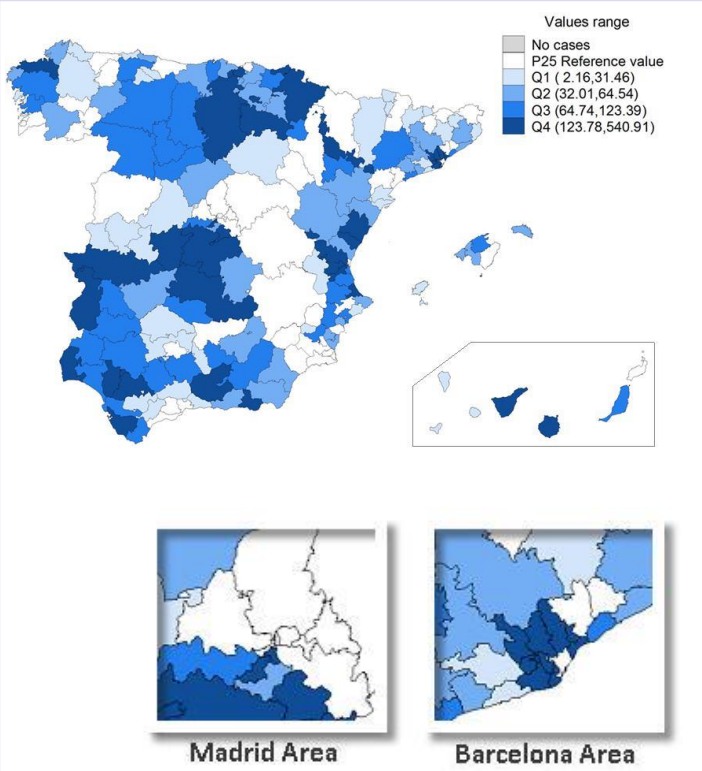


Figure 8.b. Excess cases for adenotonsillectomy per healthcare area. Scenario II: minimisation to p25. 199 healthcare areas. Year

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

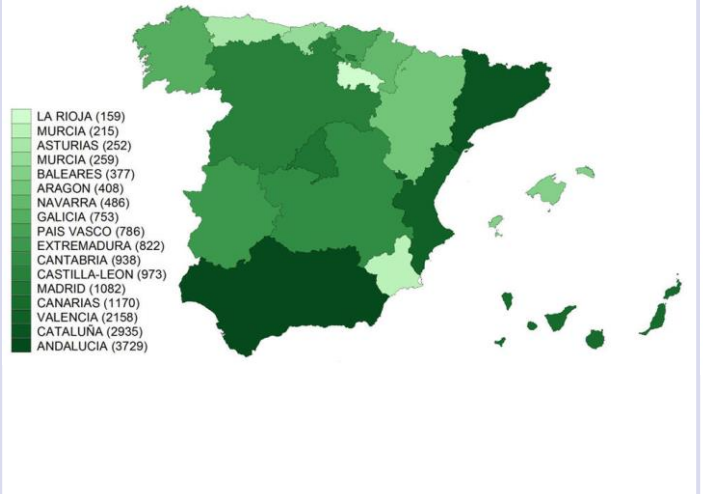


Figure 9.a. Excess cases for adenotonsillectomy. Scenario I: minimisation to p10. 17 regions. Year 2009

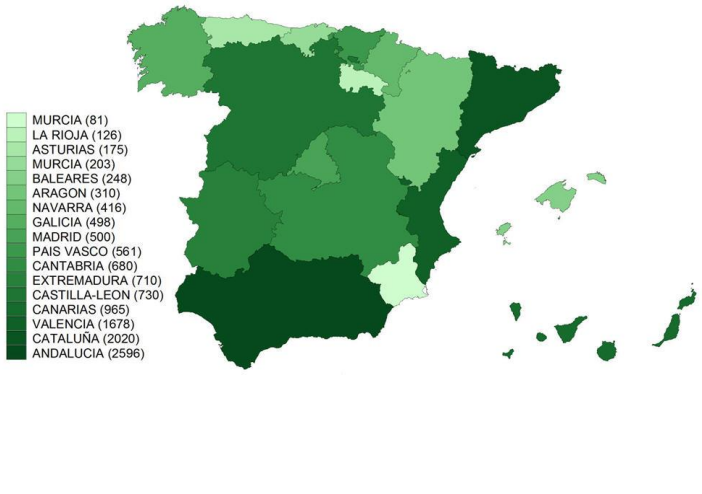


Figure 9.b. Excess cases for adenotonsillectomy. Scenario II: minimisation to p25. 17 regions. Year 2009

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

Caesarean 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 births.

First, a glance at c-section use in any condition in Spain and how it relates to burden of disease -measured as rate of births with complications per 10,000 women *(see definitions in Appendix 4)*. Figures 9 and 10 illustrate how burden of disease maps out across healthcare areas, both in absolute terms (standardised rates) and expressed in relative risk of exposure (ratio observed to expected). Relative risk appears quite polarised with most healthcare areas presenting either more (*blue shades in figure 10)* or fewer births with complications than expected *(pink areas in figure 10)*.

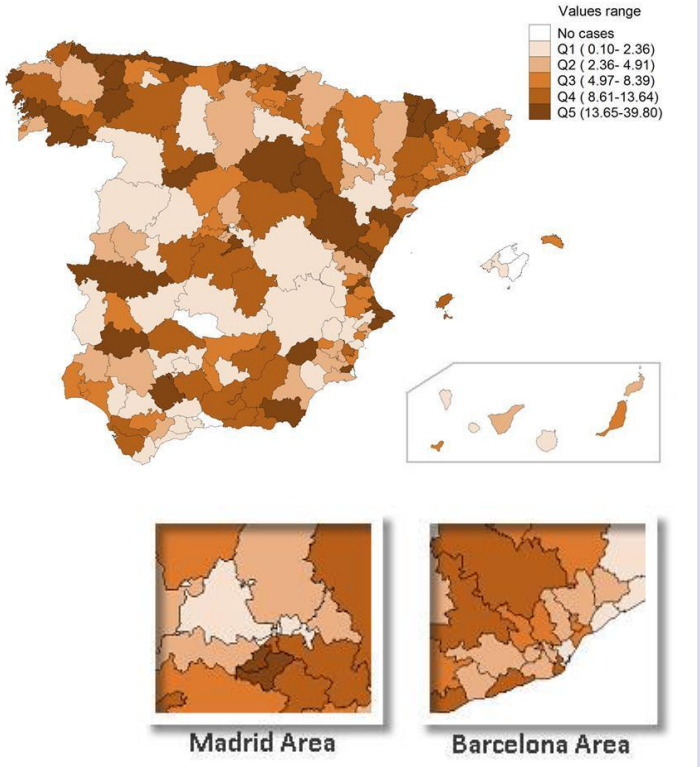


Figure 9. Age standardised Births with complication rate per 10,000 women. 199 healthcare areas. Year 2009

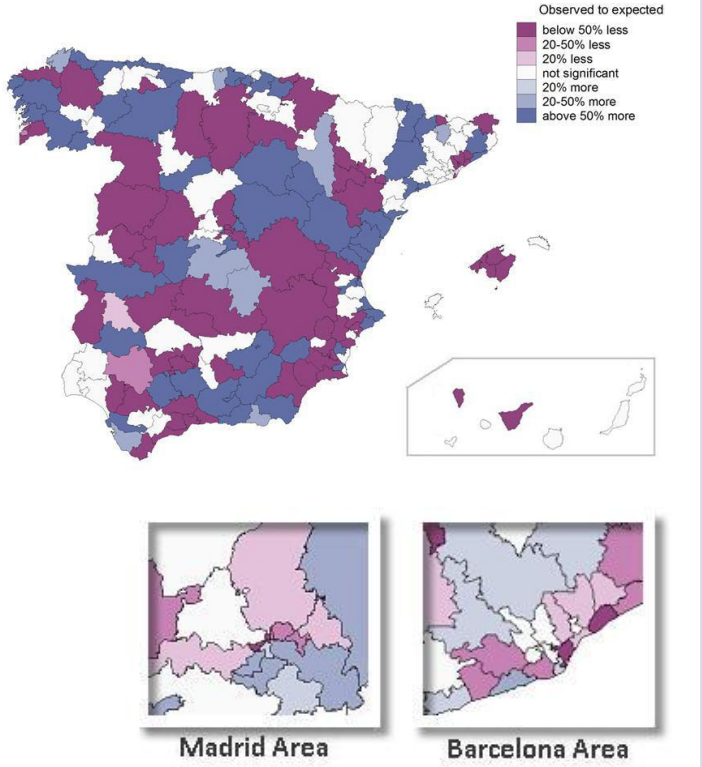


Figure 10. Admissions Ratio Observed/expected Births with complication. 199 healthcare areas. Year 2009

Map on the left: The darker the brown, the higher the rate of births with complications among women living in that area. Healthcare areas 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 right: births with complications in the areas compared to the expected average burden. 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).

An 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 performance in several healthcare areas in the country seems to be driven by factors other than need.

Exploring the degree of overlapping between c-section utilisation patterns and c-section in low risk deliveries (lower value care) yields a more congruent picture *(figures 11 and 12)*. This suggests that in most of those areas with high c-section in low risk deliveries rates, women might be bearing a higher rate of c-sections in general. However, it is also 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.

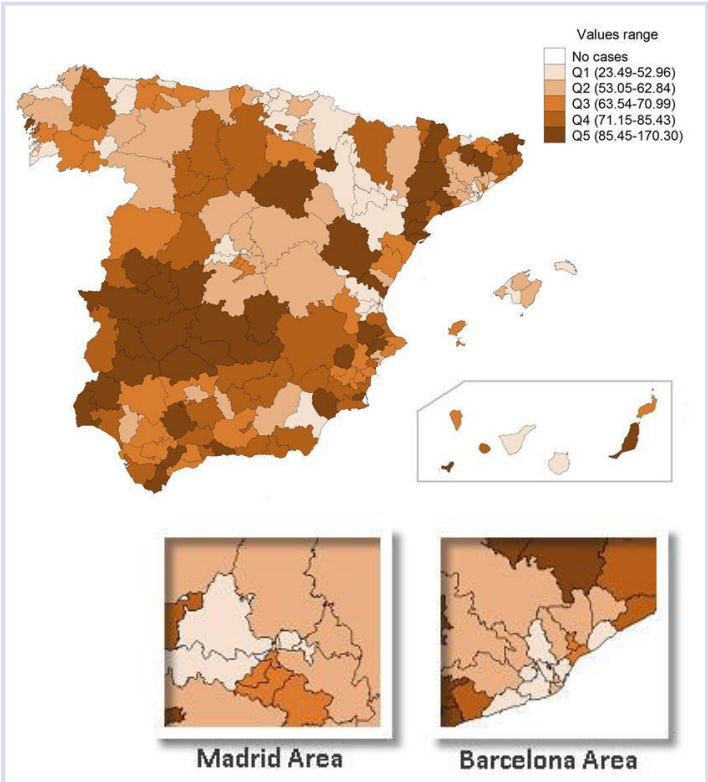


Figure 11. Age standardised c-section rate per 10,000 women aged 15-55. 199 healthcare areas. Year 2009

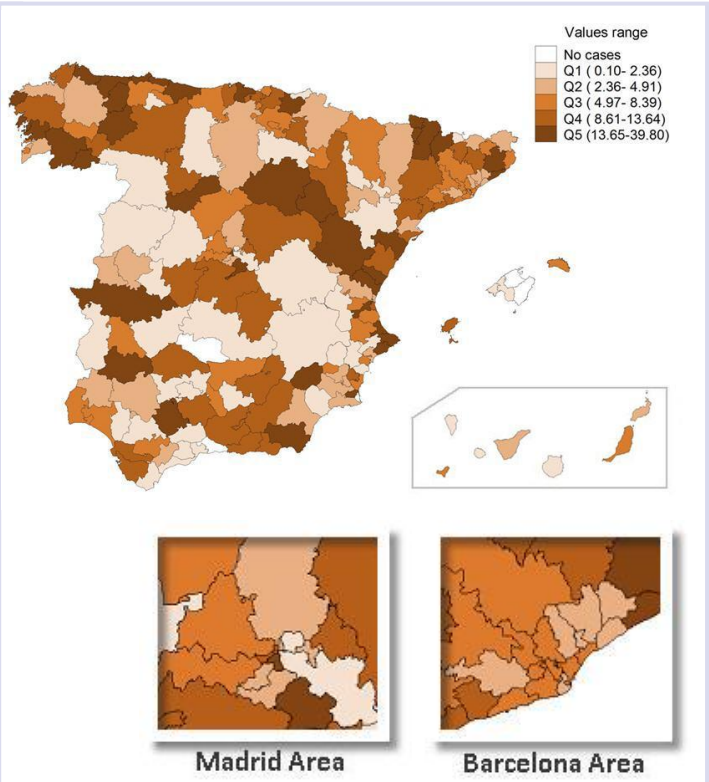


Figure 12. Age standardised c-section rate in low risk deliveries per 10,000 women aged 15-55. 199 healthcare areas. Year 2009

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

Variation for this procedure across the territory is remarkable: Spanish healthcare areas, range between null cases and figures close to 40 cases per 10,000 women, as a result women living in areas with the highest rates bear up to 35 times more chances of undergoing a lower value c-section. Besides, variation not deemed random is 1.3 times above that expected by chance. The regional level seems to explain a small 7% of the detected variation across healthcare areas (*table 2 in Appendix 2*). Thus main driver in variability seems to lay on local medical practice. This high level of heterogeneity in the provision of this lower value care procedure, suggest that there is plenty of room for enhancing appropriateness in the provision of c-section.

When the analysis is conducted at regional level, there is certain correlation between burden of births with complications and intensity in use of c-section, particularly in the southern regions with the highest rates of complicated births and with rates of c-section among the highest (*figures 13 to 15*). But, certain mismatching is also observed in regions as Navarra or Canarias with high burden of complications and low intensity in C-section; conversely, Castilla-León, with low rate of complicated births, exhibits one of the highest of c-section.

The regional pattern of lower value c-sections seems to somehow depart from the overall intensity *(figures 15 and 16);* in País Vasco, Cantabria, Asturias and Galicia relative average-low rates of c-section correspond to the highest regional level of lower-value procedures. The opposite pattern can be detected in Murcia, La Rioja and to a lesser extent Andalucia, showing among the largest rates of c-section, but among the smallest for the lower-value indication

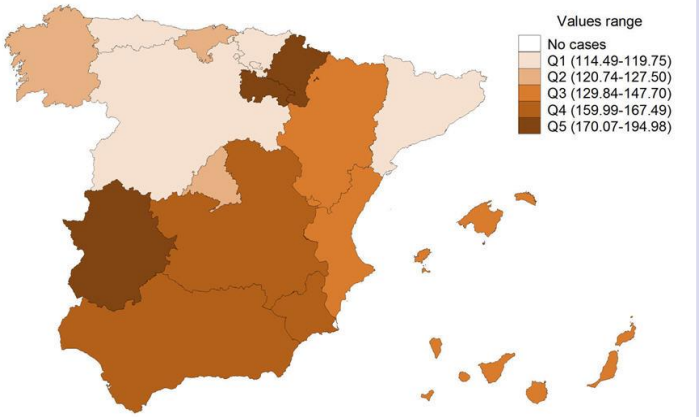


Figure 13. Age standardised Births with complications rate per 10,000 women. 17 regions. Year 2009

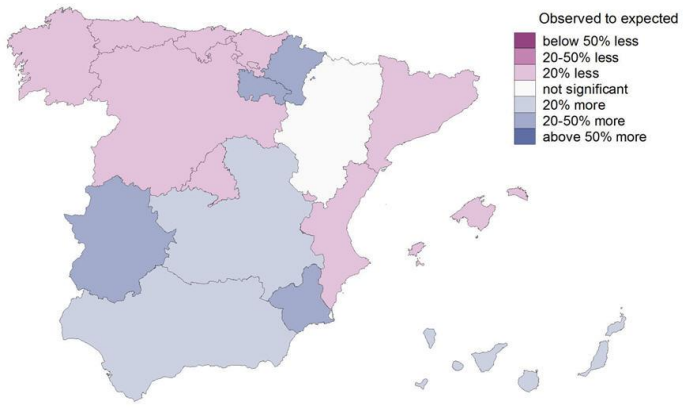


Figure 14. Admissions Ratio Observed/expected Births with complication. 17 regions. Year 2009

Map on the left: The darker the brown, the higher the exposure 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 of birth with complication 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).

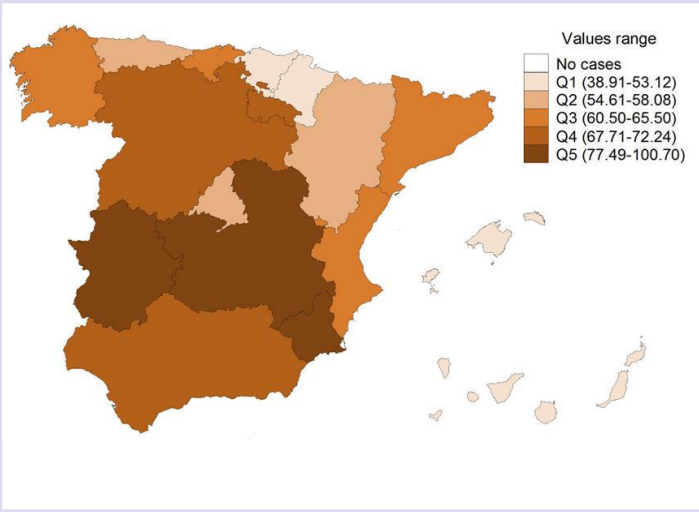


Figure 15. Age standardised c-section rate per 10,000 women aged 15-55. 17 regions. Year 2009

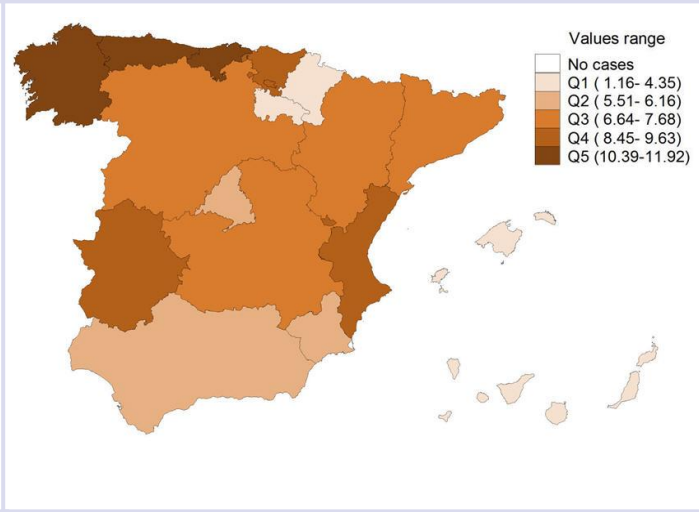


Figure 16. Age standardised c-section rate in low risk deliveries per 10,000 women aged 15-55. 17 regions. Year 2009

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

The distance between the observed exposure to lower value c-sections and the optimisation benchmarks is drawn in figures 18 and 19 for the two tiers of health administration, healthcare areas and regions.

The most conservative scenario of minimisation *(figures 18.b and 19.b)* quantifies the excess lower value c-sections in Spain in a year in 7,455 interventions *(table 3 Appendix 2)*. The distribution of those cases is, obviously, uneven across healthcare areas; figures 18.a and 18.b map out in darker shades those areas that may be a priority target for interventions to reduce the utilisation of c-sections in low risk births (the maximum local potential for reduction estimated in between 71 and 375 interventions per year (*Q4 in figures 17.a and 17.b*).

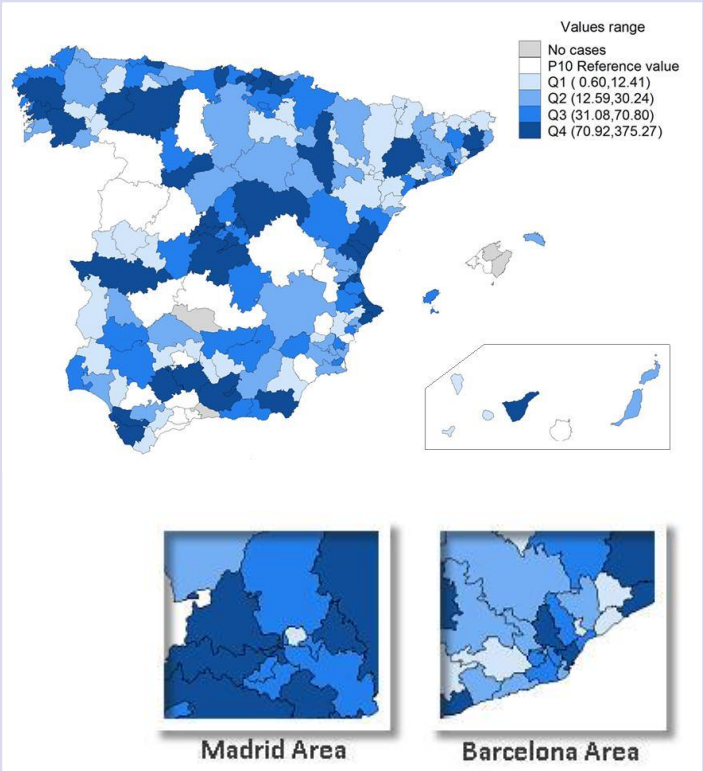


Figure 17.a. Excess cases for c-section in low risk deliveries per healthcare area. Scenario I: minimisation to p10.
199 healthcare areas. Year 2009

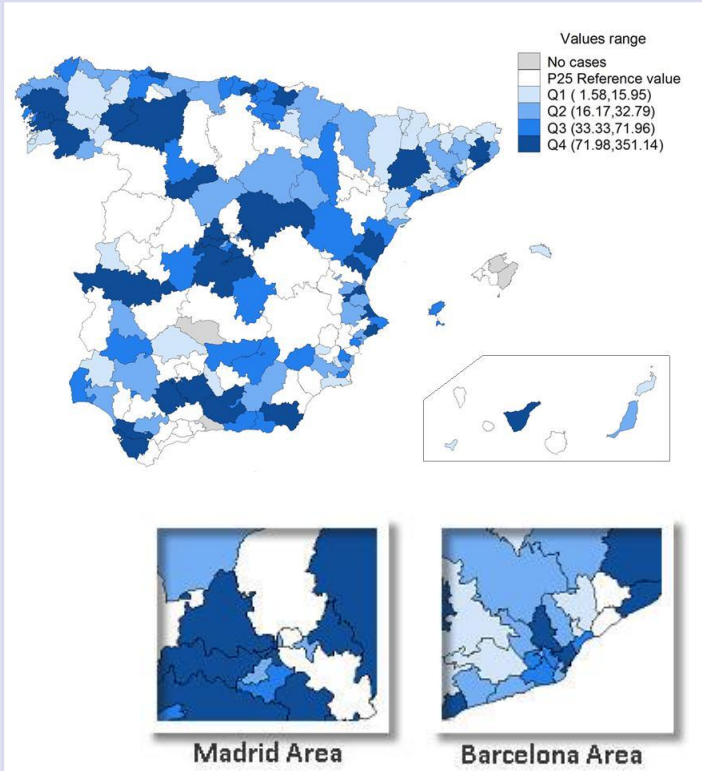


Figure 17.b. Excess cases for c-section in low risk deliveries per healthcare area. Scenario II: minimisation to p25.
199 healthcare areas. Year 2009

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

The same quantification for potential reduction in use of lower value c-sections was conducted at regional level (*figures 18.a and 18.b*). The most conservative scenario (*figure 18.b*) estimates regional impact in potentially avoidable cases in between 0 and 1,245, while the more demanding (*figure 18.a*) setting ranges from 4 to 1,436 per year, depending on the region

Figure 18.a. Excess cases for c-section in low risk deliveries
Scenario I: minimisation to p10. 17 regions. Year 2009

Figure 18.b. Excess cases for c-section in low risk deliveries.
Scenario II: minimisation to p25. 17 regions. Year 2009.

The darker the green the larger the number of excess cases estimated at region level, if all healthcare areas 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 can be considered lower-value care.

Figures 19 and 20 allow for a comparison of the distribution of non-oncologic and oncologic hysterectomies across healthcare areas in Spain

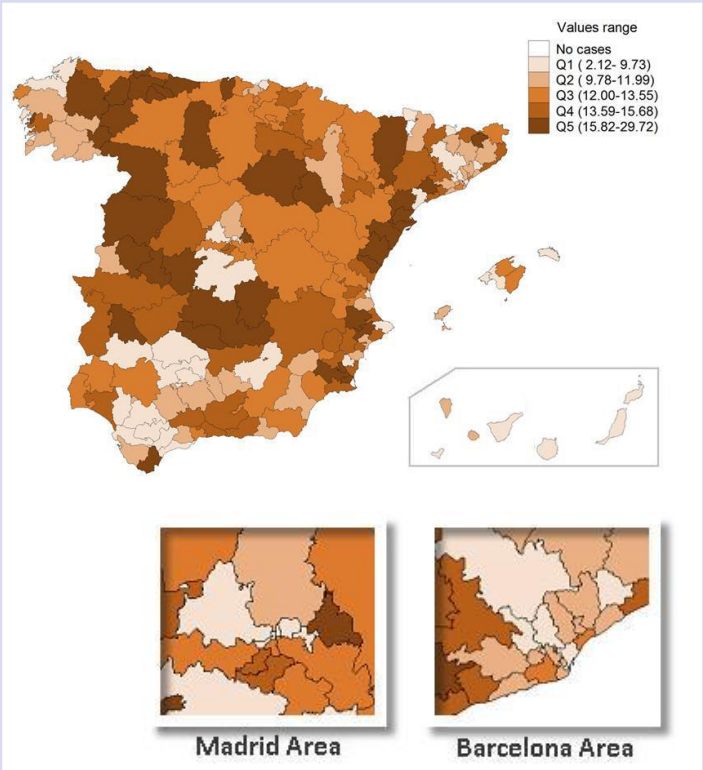


Figure 19. Hysterectomy utilisation in non-oncologic diagnoses (age-standardized rate per 10,000 women aged 18 years or older). 199 healthcare areas. Year 2009

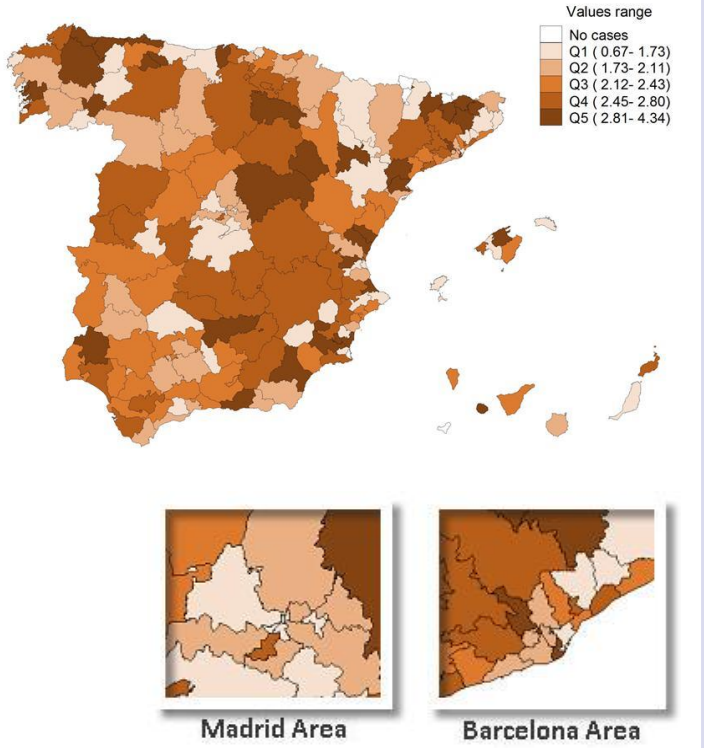


Figure 20. Hysterectomy utilisation in uterus cancer (age-standardised rate per 10,000 women). 199 healthcare areas. Year 2009

The darker the brown, the higher the exposure to hysterectomy for women living in those areas. Healthcare areas are clustered into 5 quintiles according to their utilisation rate value (Q1 to Q5) –legend provides the range of standardised rates within each quintile.

Note that utilisation rates for the lower-value indication are significantly higher overall than for the adequate one (healthcare areas with the highest hysterectomy utilisation rates in the cancer indication -5th quintile- range between 3 and 4 procedures per 10,000 adult women, escalating to 16 to 30 interventions for the lower-value indication).

Furthermore, excluding the cancer indication, the differences in women's probability to get a hysterectomy could be as large as 3 times, depending on their healthcare area of residence (*table 2 Appendix 2*). However, only 11 % of this variation can be deemed not random or systematic, and the region where the healthcare area belongs seems to explain up to a 22%. Thus, regional strategies or planning of services may play a role modulating this procedure provision.

Using regions as the unit of analysis, the intensity of use of both cancer and lower-value hysterectomy indications seem to correlate in Cataluña, Valencia, Murcia, Madrid, Asturias, País Vasco and both archipelagos. Conversely, other regions, as Galicia or Andalucia, with relative high rates of hysterectomy in uterus cancer, exhibits low rates when the indication is non oncologic. In turn, in Extremadura or Castilla-León with average hysterectomies in cancer, have higher rates when the indication is other (*figures 21 and 22)*.

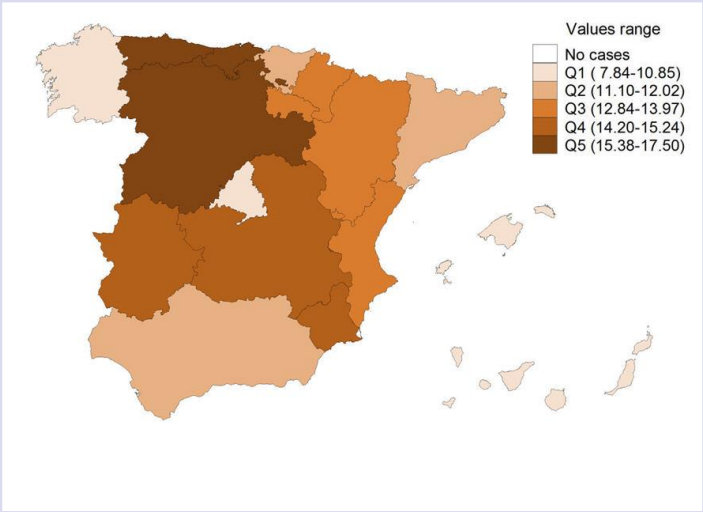


Figure 21. Hysterectomy in non-oncologic diagnoses (Age-standardised rate per 10,000 women aged 18 years or older). 17 regions. Year 2009

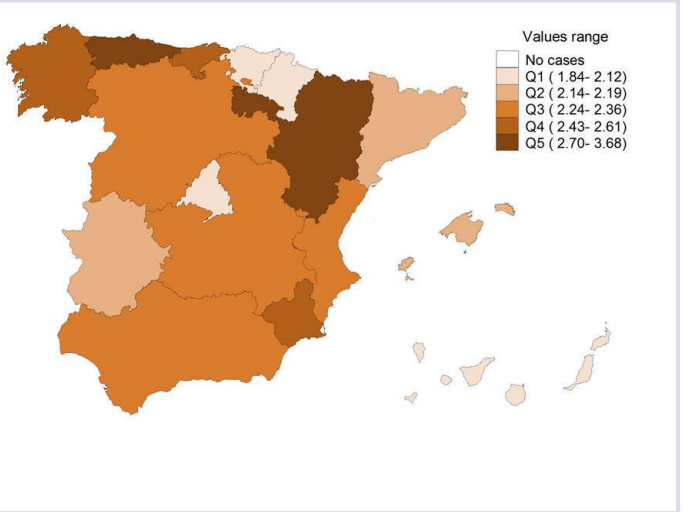


Figure 22 Hysterectomy in uterus cancer (age-standardised rate per 10,000 women). 17 regions. Year 2009

The darker the brown, the higher the exposure to hysterectomy of women living in those regions. Healthcare areas are clustered into 5 quintiles according to their utilisation rate value (Q1 to Q5) –legend provides the range of standardised rates within each quintile.

The potential for minimisation of lower-value hysterectomy use at healthcare area level is summarised in figures 22 and 23, displaying the two usual scenarios. The most conservative one, benchmarking against those healthcare areas in the lowest quartile of utilisation, yields a range of excess cases per municipality between 3 and 196 per year (*figure 23*).

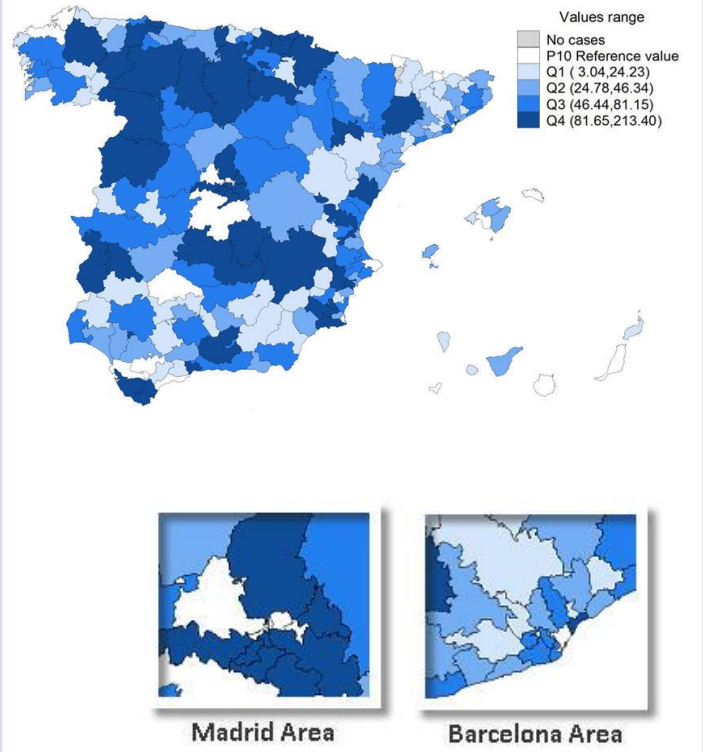


Figure 22. Excess cases for hysterectomy in non-oncologic conditions. Scenario I: minimisation to p10.
199 healthcare areas. Year 2009

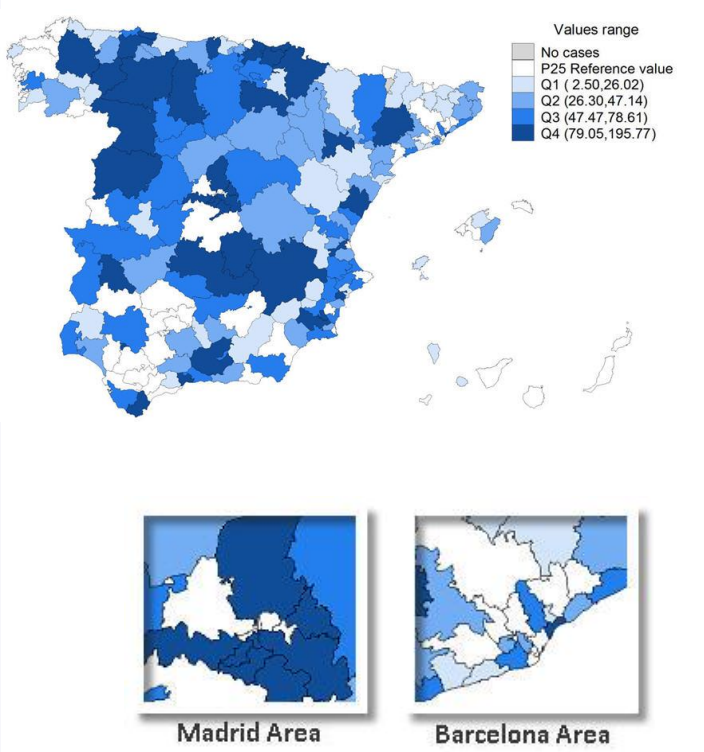


Figure 23. Excess cases for hysterectomy in non-oncologic conditions. Scenario II: minimisation to p25.
199 healthcare areas. Year 2009

The darker the blue the larger the difference between the observed number of cases and the benchmark -excess cases if areas behaved as those healthcare areas with the lowest utilisation rates -p10 and p25. Healthcare areas 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, Andalucia, Valencia and Cataluña regions show the larger potential for avoiding excess cases in the range of 1000 cases per year, far from Canarias, Baleares and La Rioja that exhibit fewer than 100 lower-value hysterectomies in excess per year (*figure 25, see figure 24 for the less conservative estimations*).

Figure 24. Excess cases for hysterectomy in non-oncologic conditions. Scenario I: minimisation to p10. 17 regions. Year 2009

Figure 25. Excess cases for hysterectomy in non-oncologic conditions. Scenario II: minimisation to p25. 17 regions. Year 2009

The darker the green the larger the number of excess cases estimated at region level, if all healthcare areas 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. Surgical procedures in place are conservative (CS), which preserves part of breast glandular tissue, or non-conservative (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 Spain shows the lowest NCS utilisation rate among ECHO countries, figure 26 shows how the national rate builds up from the intensity of use at individual healthcare areas.

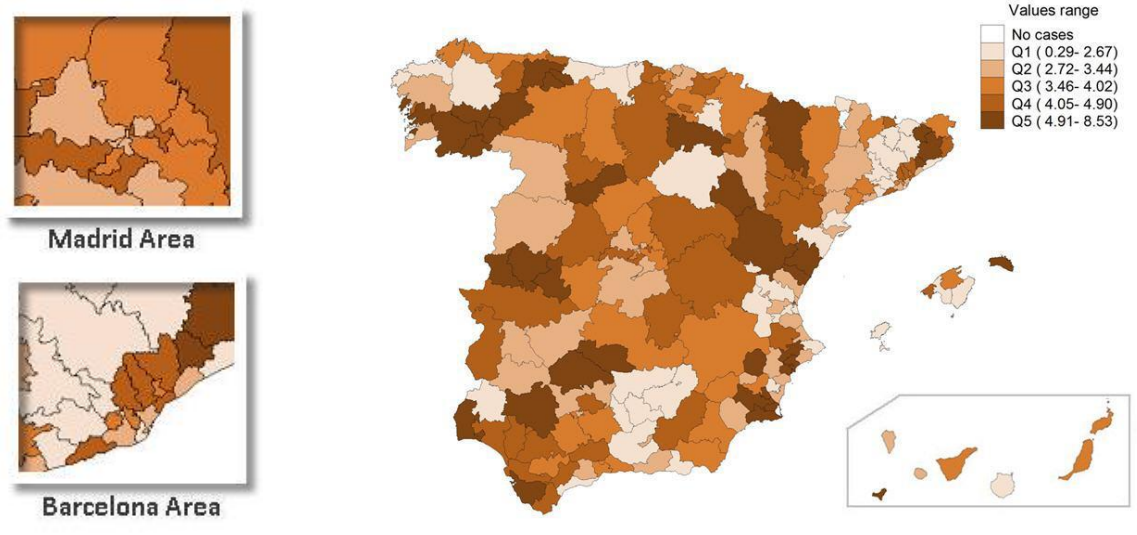


Figure 26. Age-standardised non-conservative surgery in breast cancer utilisation rate per 10,000 women. 199 healthcare areas. Year 2009

The darker the brown shade, the higher the exposure to non-conservative surgery of women living those areas. Healthcare areas 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 wide: from 1 non-conservative surgery per 34,483 women to 1 per 1,172. If we exclude tail-values and compare areas at 5^{h} and 95th percentiles of utilisation, women face up to a 3-fold difference in the probability of undergoing lower-value breast surgery depending on their healthcare area of residence. However, only 8% of this variation exceeds what could be randomly expected, and the region where the area belongs merely explains 9% of it (*table 2 Appendix 2*).

The analysis at regional level attenuates differences across the territory yielding a range of extreme rates from 1 mastectomy per 3,846 women to 1 per 1,538 (*figure 27*).

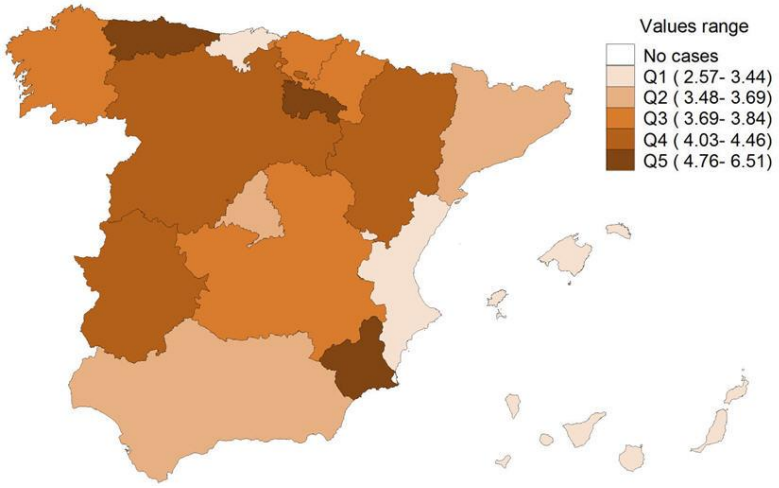


Figure 27. Age-standardised non-conservative surgery in breast cancer utilisation rate per 10,000 women. 17 regions. Year 2009

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 28.b)*, women are bearing an excess of this lower-value care in between 1 and 117 excess cases in a year depending on their healthcare area of residence. The same analysis performed at regional level *(figures 29.a and 29.b)* yields that the excess NCS cases could reach 600 in Andalucia, while in Murcia moves around 15 excess lower-value interventions per year.

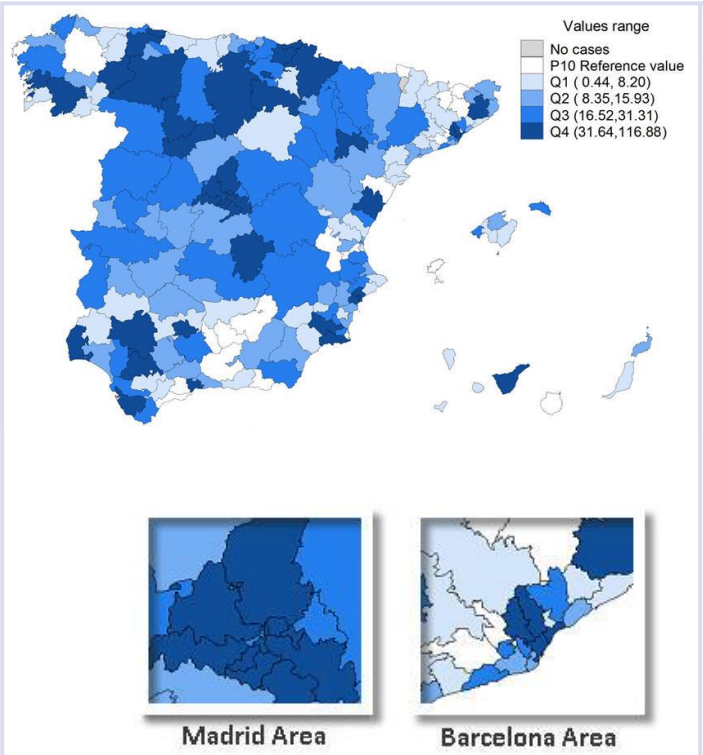


Figure 28.a. Excess cases for non-conservative surgery in breast cancer. Scenario I: minimisation to p10. 199 healthcare areas. Year 2009

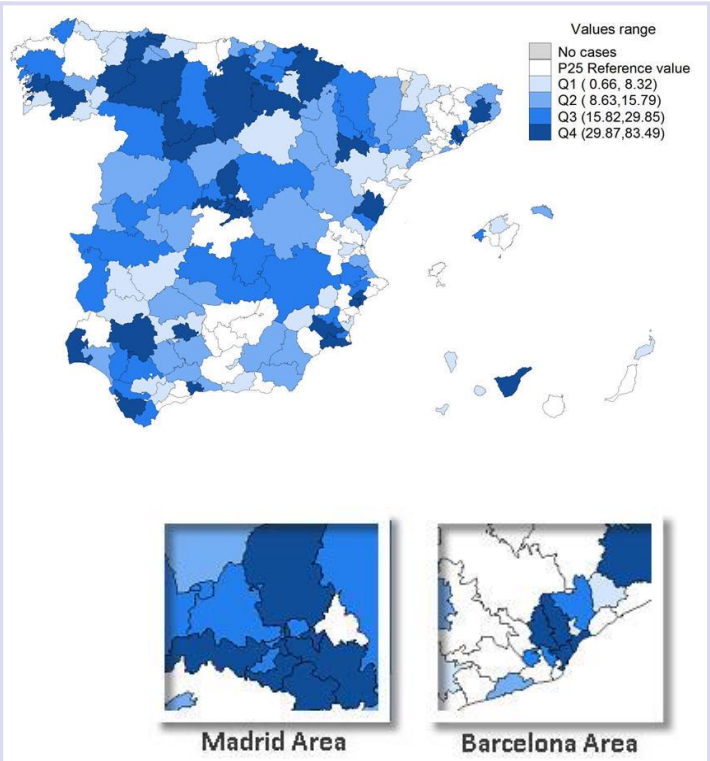


Figure 28.b. Excess cases for non-conservative surgery in breast cancer. Scenario II: minimisation to p25. 199 healthcare areas. Year 2009

The darker the blue the larger the difference between the observed number of cases and the benchmark -excess cases if areas behaved as those healthcare areas with the lowest utilisation rates -p10 and p25. Healthcare areas 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 for non-conservative surgery in breast cancer. Scenario I: minimisation to p10. 17 regions. Year 2009

Figure 29.b. Excess cases for non-conservative surgery in breast cancer. Scenario II: minimisation to p25. 17 regions. Year 2009

The darker the green the larger the number of excess cases estimated at region level, if all healthcare areas 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 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 in dealing with BPH and, in particular, misuse in asymptomatic or barely symptomatic cases.

Spain has the second highest prostatectomy rate in BPH across ECHO countries *(see section II)*. Variation within the country covers an array from about 1 in 4,350 men to 1 in 230, depending on the healthcare area of residence *(figure 30)*; this translates into men living in a healthcare area at the top utilisation rate bearing almost 4 times more probabilities to get their prostate removed than those residents in a bottom rate place (if we exclude tail-values and compare areas at 5^{h} and 95th percentiles of utilisation).

Such differences are hardly amenable to differences in need. Up to 18% of this variation exceeds what could be randomly expected; also, it seems that it is not entirely amenable to factors operating within each healthcare area, since the regional level contributes to explain 16% of that variation (*table 2 Appendix 2*).

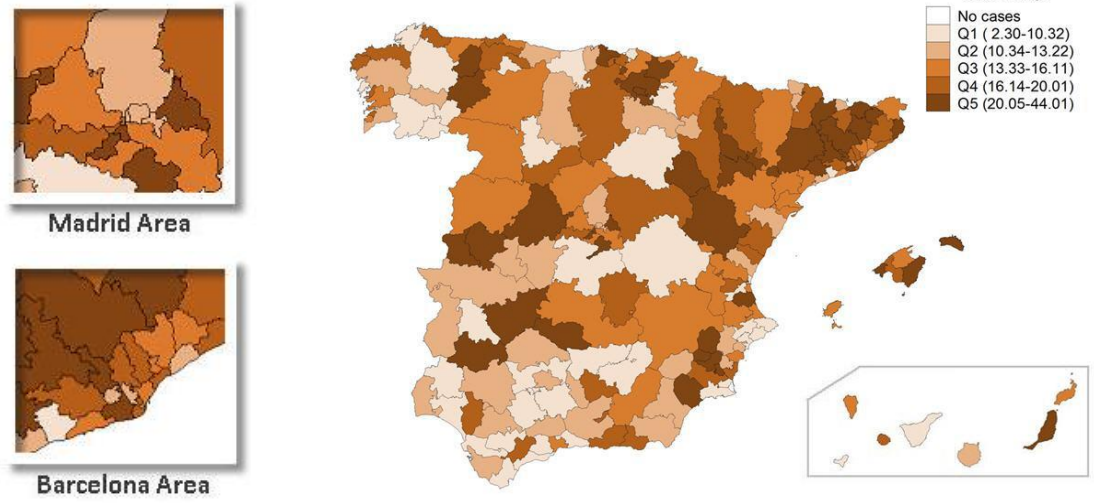


Figure 30. Age-standardised prostatectomy in benign prostatic hyperplasia (rate per 10,000 male aged 40 or older)
199 healthcare areas. Year 2009

The darker the brown shade, the higher the exposure to prostatectomy of men living in those areas. Healthcare areas are clustered into 5 quintiles according to their rate value (Q1 to Q5) –legend provides the range of standardised rates within each quintile.

The estimation of excess cases in a year per healthcare area (*figures 32.a and 32.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 1, for the areas already in lower utilisation intensity, to 239-320 for those more prone to use it.

The estimations at regional level for both scenarios yield a minimum 20 excess interventions in La Rioja, up to more than 1,500 in Cataluña. Overall, some 6,700 to 8,650 excess-interventions in a year at country level, depending on the minimising scenario *(tables 3 and 4 Appendix 2)*.

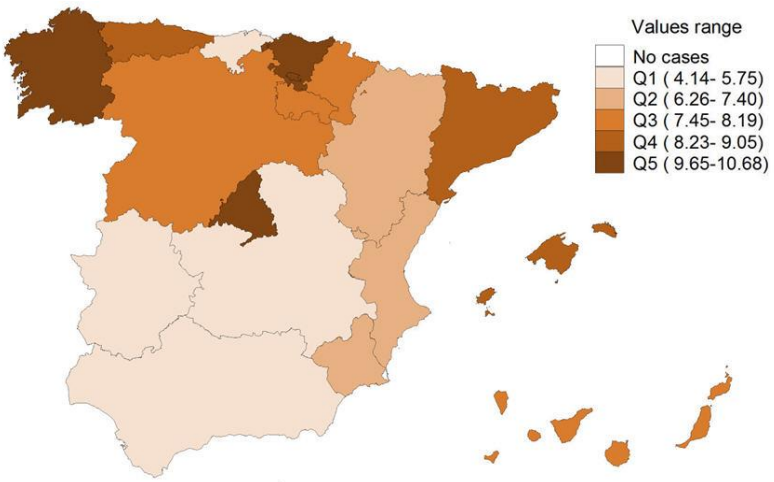


Figure 31. Age-standardised Prostatectomy in benign prostatic hyperplasia utilisation rate per 10,000 male aged 40 or older. 17 regions. Year 2009

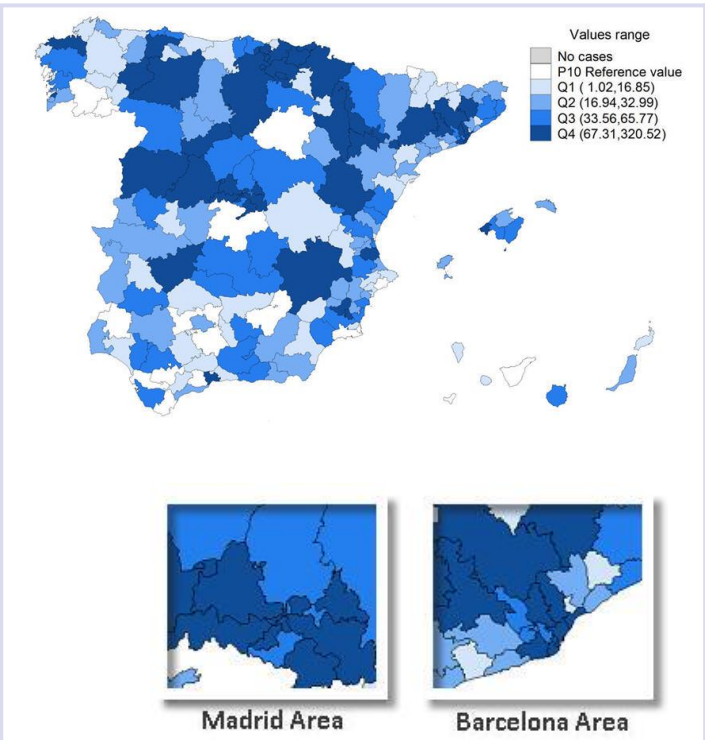


Figure 32.a. Excess cases for prostatectomy in benign prostatic hyperplasia. Scenario I: minimisation to p10.
199 heathcare areas. Year 2009

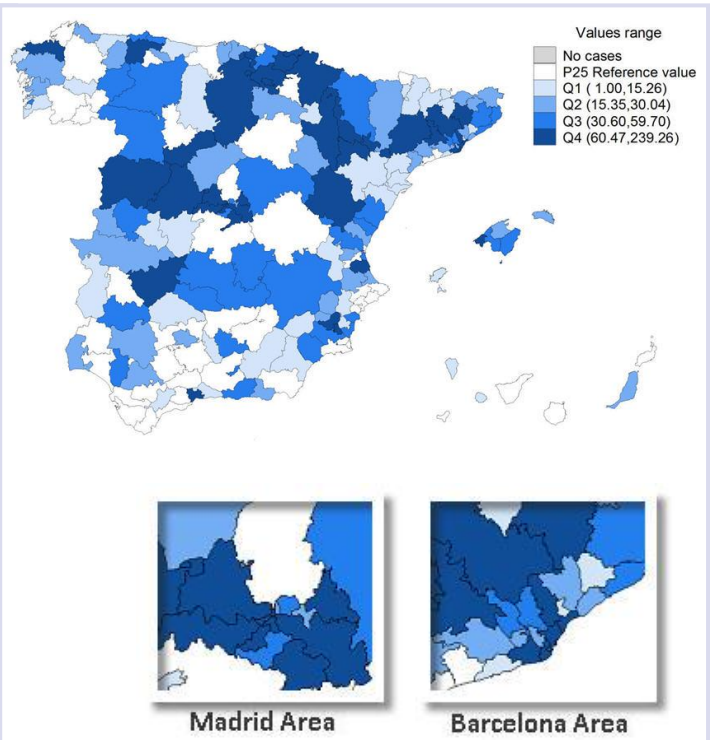


Figure 32.b. Excess cases for prostatectomy in benign prostatic hyperplasia. Scenario II: minimisation to p25.
199 heathcare areas. Year 2009

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

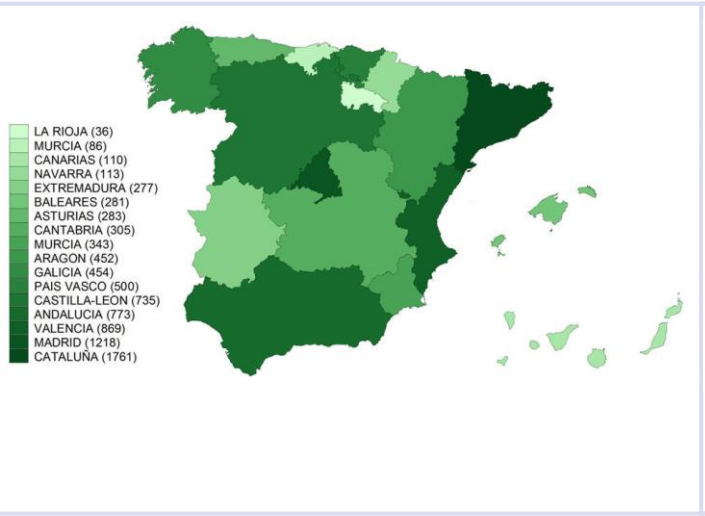


Figure 37.a. Excess cases for prostatectomy in benign prostatic hyperplasia. Scenario I: minimisation to p10. 17 regions. Year 2009

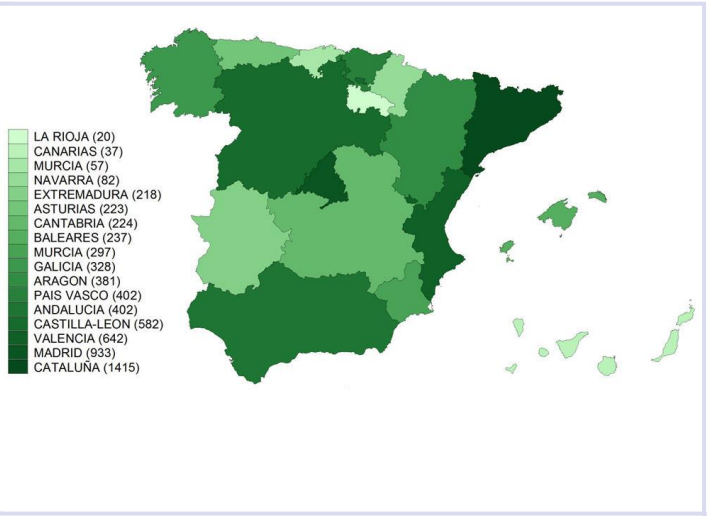


Figure 37.b. Excess cases for prostatectomy in benign prostatic hyperplasia. Scenario II: minimisation to p25. 17 regions. Year

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

IV. EVOLUTION OVER TIME

LVC utilisation rates have tended to stay fairly stable since 2002, as well as the systematic variation across healthcare areas staying in most cases at moderate levels signalling how differences in local practice across the country keep on along time

Between 2002 and 2009, utilisation rates of lower-value care show different trends depending on the procedure, but the general feature seems to be relative stability in the rates over the period *(figure 39 and tables 5 to 9 in Appendix 2)*.

NCS in breast cancer and prostatectomy in BPH rate stayed almost constant with little decreases by 1% and 4% respectively. Their systematic variation also remained quite stable, being around 10% and 20% above that expected by chance in NCS and prostatectomy, respectively.

A bit more substantial were the changes in c-section use in low risk deliveries with an irregular profile along the period. Despite this uneven evolution, the net increase over time was only about 7%. In turn, its systematic variation was very high all the period exceeding by far what would be expected by chance, pointing out unwarranted variation in exposure to this procedure across residents in different healthcare areas.

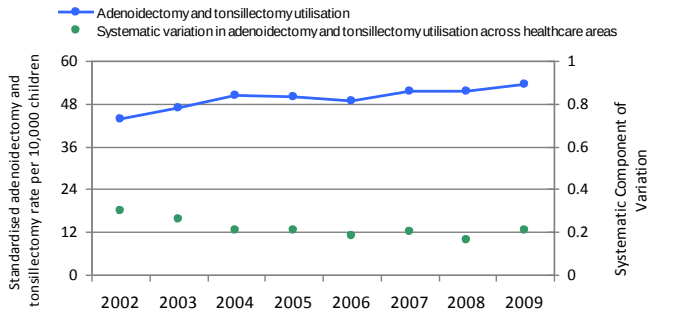
Adenotonsillectomy showed the higher rise, going 23% higher, from 1 surgery per 230 to 1 per 187 children, while its systematic variation decreased continuing at moderate levels.

In turn, hysterectomies in non-oncologic conditions decreased by 21%; from 1 hysterectomy per 595 women to 1 per 697 women and variation not deemed random remained in values around 10%.

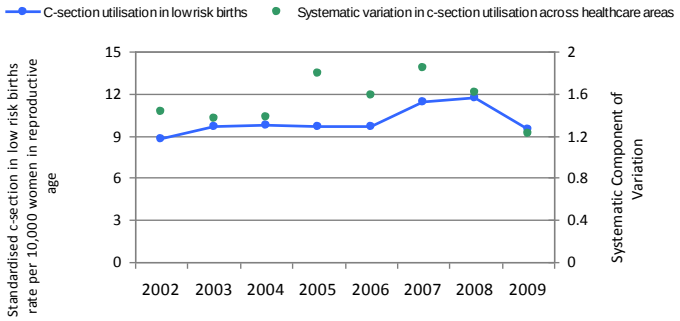
Graphs in this section provide information on two issues: the evolution of the utilisation rate (blue lines representing the standardised rate) and the evolution of the non-random variation (green dots representing the systematic component of variation), over time.

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 systematically more exposed to lower-value care, which, in turn, warrants the identification and specific targeting of those healthcare areas more deviant from the desirable minimal utilisation.

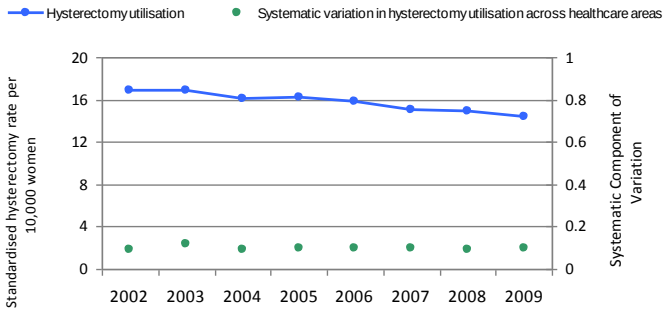
Adenotonsillectomy



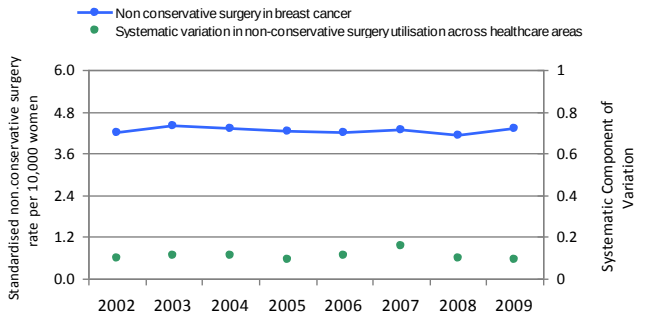
Cesarean section in low risk deliveries



Hysterectomy



Non conservative surgery in breast cancer



Prostatectomy in benign prostatic hyperplasia

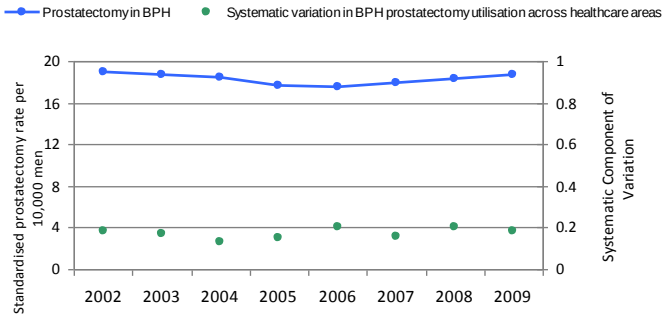


Figure 38. Evolution of standardised rates (blue lines) and systematic variation (green dots) over time

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

The outlined insight on considering overall trends in utilisation rate and systematic variation can be confirmed by looking at the individual behaviour of healthcare areas over the period of analysis.

> This section offers only a few selected examples, but individual healthcare areas' evolution over time can be tracked in their original dynamic charts at
>
> http://www.echo-health.eu/handbook/quintiles_lvc_spn.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 established might be the medical practice underpinning such utilisation and how homogeneous or diversely shaped, over time and across healthcare areas.

Regarding adenotonsillectomy Figure 40.a tracks healthcare areas which, at the beginning of the period, were in the lowest quintile of interventions per 10,000 children in the country (quintile 1); of the 2 areas selected, their behaviour starts diverging from 2003 with children in Toledo increasing their probability of receiving the intervention while their equals in Cartagena remained among the lowest rates for the whole period. Figure 40.b portraits the same phenomenon, but for healthcare areas starting in the opposite side, at the top of the utilisation range. The resulting array of bubbles in 2009 shows how a good share of the areas starting in quintile 1 have tended to escalate their utilisation level by two or three quintiles; as well as those already starting in the upper utilisation level have remained at the same intensity or going down one or two quintiles.

For c-section in low risk births the majority of those healthcare areas in the bottom level of intensity have remained in the same or next utilisation quintile, while those in the upper bound have spread out over all utilisation quintiles (*figures 41.a and 41.b*)

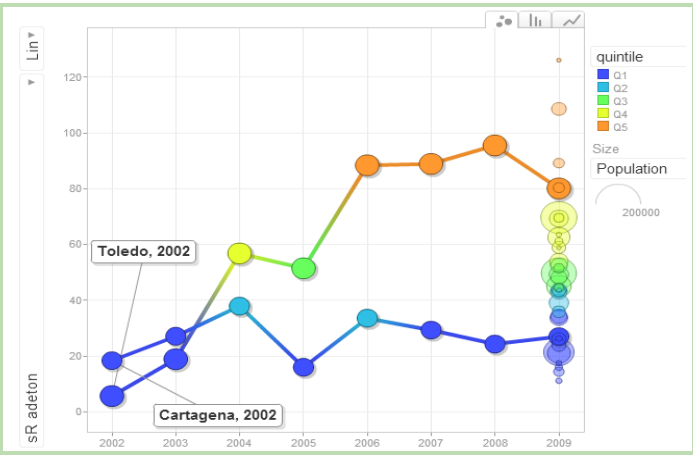


Figure 40.a. Trends in adenotonsillectomy. Q1

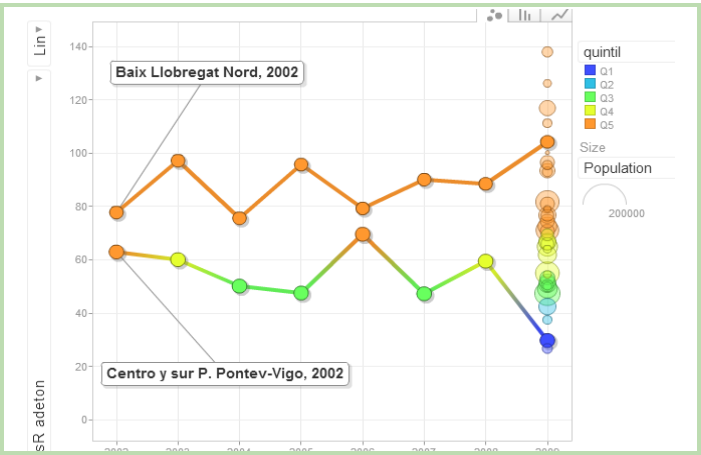


Figure 40.b. Trends in adenotonsillectomy. Q5

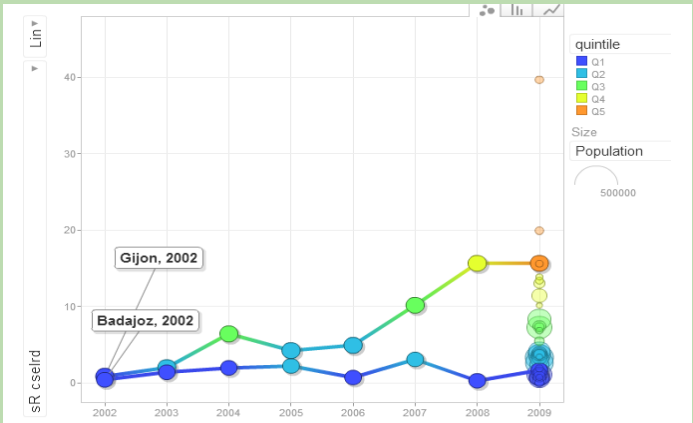


Figure 41.a. Trends in c-section in low risk deliveries. Q1

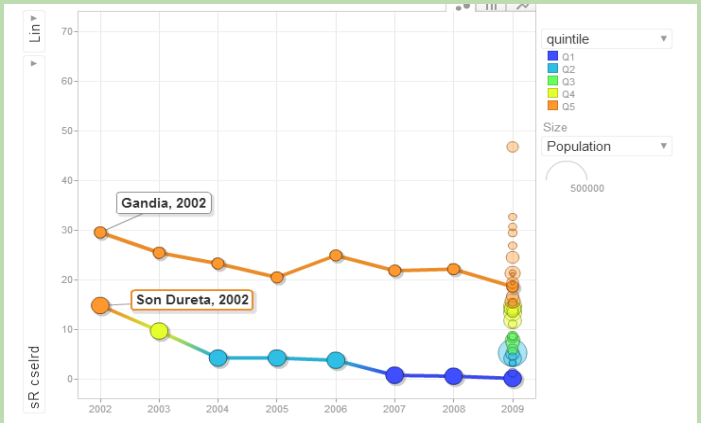


Figure 41.b. Trends in c-section in low risk deliveries. Q5

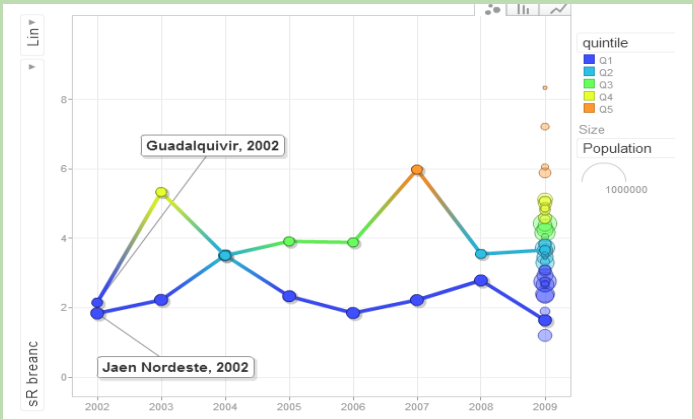


Figure 42.a. Trends in non-conservative surgery in breast cancer Q1

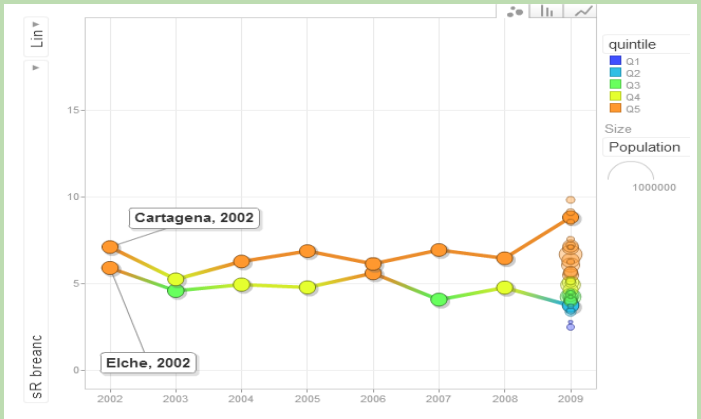


Figure 42.b. Trends in non-conservative surgery in breast cancer. Q5

All figures chart standardised utilisation rates per 10,000 inhabitants, and time, in years. Bubbles represent individual healthcare areas, 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 standardized rate each year is marked by the position in the y-axis. The array of bubbles represented on 2009 reflects only those healthcare areas that in 2002 where in the same utilisation quintile as the two traced Q1 Q2 Q3 Q4 Q5

Those areas at both ends of extreme utilisation rates of NCS in breast cancer, show a variety of paths, but by the end of the period most of them stayed in the same or next quintile of use (*figures 42.a and 42.b)*. In hysterectomy utilisation in non-oncologic conditions, the spread of individual areas by 2009 for those starting in quintiles 1 and 5 has stretched to cover the whole range of intensity of use. The same is true for the places starting at the extremes of prostatectomy in BPH (*figures 43 and 44*).

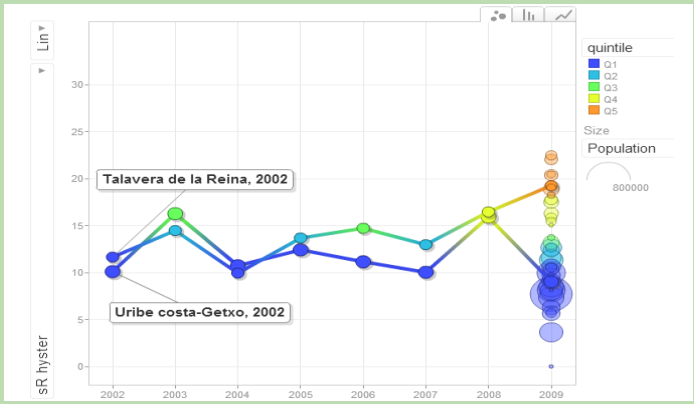


Figure 43.a. Trends in hysterectomy non-oncologic. Q1

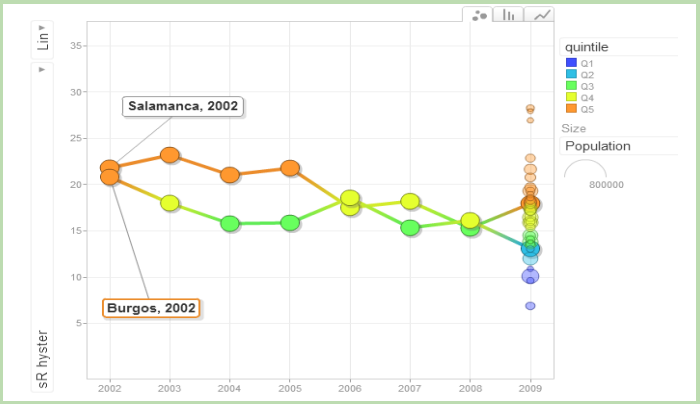


Figure 43.b. Trends hysterectomy non-oncologic. Q5

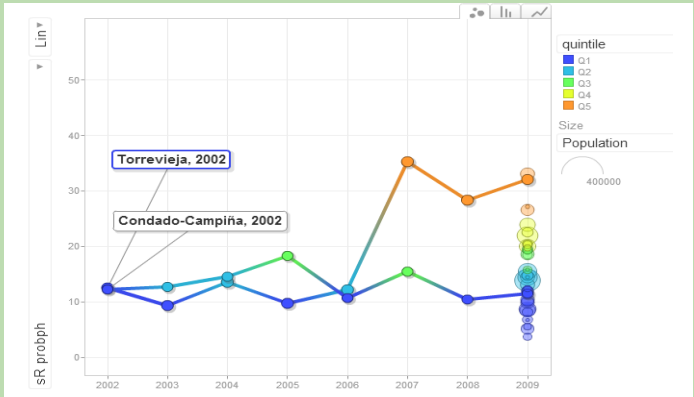


Figure 44.a. Trends in Prostatectomy in benign prostate hyperplasia. Q1

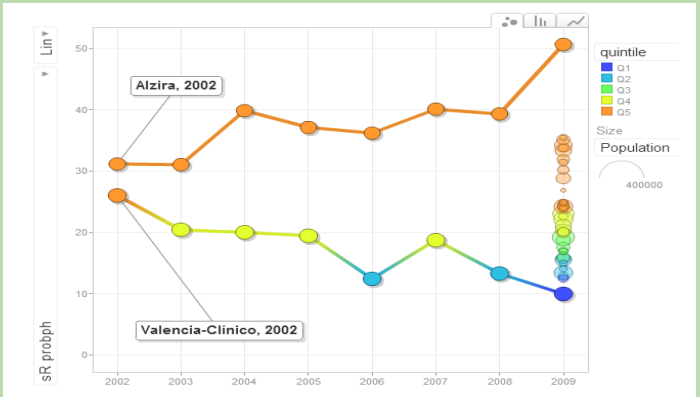


Figure 44.b. Trends in Prostatectomy in benign prostate hyperplasia. Q5

All figures chart standardised utilisation rates per 10,000 inhabitants, and time, in years. Bubbles represent individual healthcare areas, 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 standardized rate each year is marked by the position in the y-axis. The array of bubbles represented on 2009 reflects only those healthcare areas that in 2002 where in the same utilisation quintile as the two traced Q1 Q2 Q3 Q4 Q5

V. SOCIAL GRADIENT

Only prostatectomy in BPH showed statistically significant differences between better and worse-off areas: being the rate significantly higher in wealthier healthcare areas. In those cases, lower average income seems to decrease exposure to lower value care.

The distribution of lower-value care utilisation seems to be quite homogeneous across different wealth quintiles for the whole period (*figure 45 and tables 5 to 9 in Appendix2*). The only exception regards men's exposure to prostatectomy in BPH, which seems to increase when they live in wealthier areas. Nevertheless, these differences are only significant in 2006, 2008 and 2009.

C-section shows an interesting behaviour in both general and lower value indications. Total c-section is significantly more frequent in most deprived healthcare areas, except in 2006 to 2008. Besides it shows an increasing trend over time. Conversely, since 2005 c-section in low-risk births occurs more often in wealthier areas. These differences are not significant because confidence intervals overlap, but it is worth noting that meanwhile c-section in low risk births stayed constant in most deprived areas, in wealthier ones increased by 19% (*figure 45 and table 6 in Appendix2*).

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

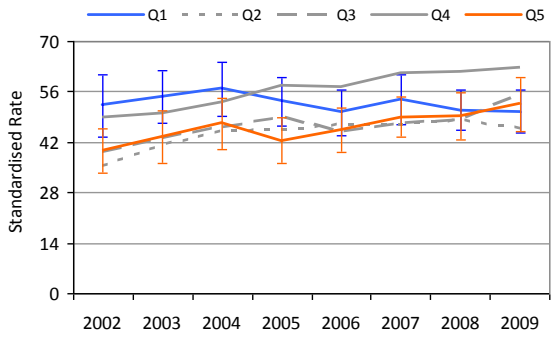
The wider the gap between most and least affluent quintile lines, the more inequitably distributed the exposure to low value care will be. Such eventual gap could be widening, narrowing or maintained over time.

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.

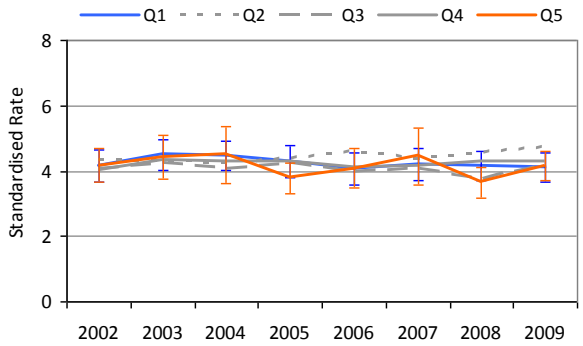
The desirable pattern will show no statistically significant differences across healthcare areas amenable to their wealth. If such differences were present, a positive time trend will consist in progressively narrowing the gap till, eventually, disappearing.

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.

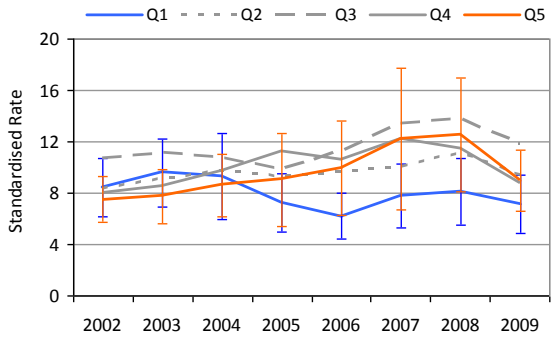
Adenotonsillectomy



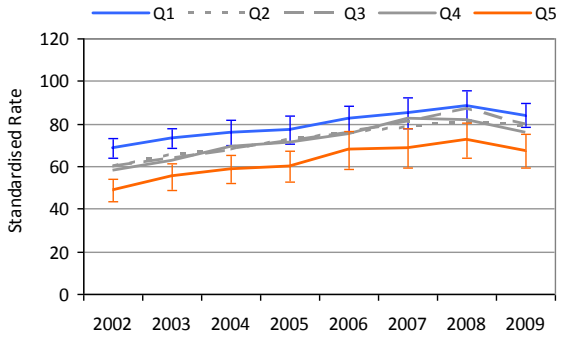
Non-conservative breast cancer surgery



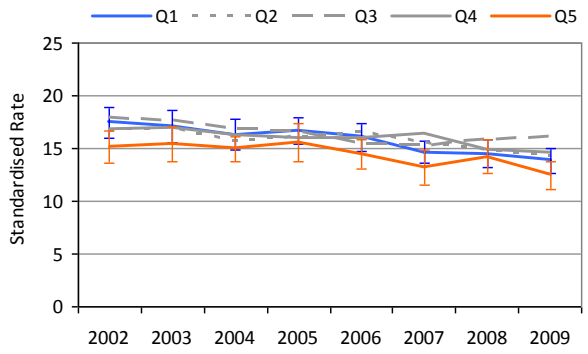
C-section low risk deliveries



Total c-section



Hysterectomy non oncologic conditions



Prostatectomy in benign prostatic hyperplasia

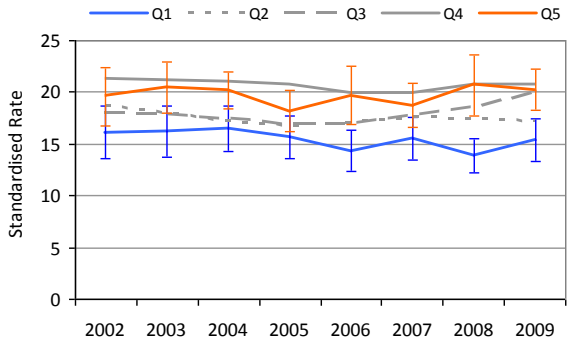


Figure 45 Over time evolution of LVC utilisation rates per quintiles of healthcare areas average income (Q1 = lowest; Q5 =highest income)

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 two 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 39,000 excess-interventions in a year for the conservative scenario and 49,000 in the drastic one. The estimation is summarised in the following table:

	Estimated excess-interventions	
	Conservative p25	Drastic p10
Adeno and/or tonsillectomy	13,003	17,557
C-section in LRD	7,455	8,437
Hysterectomy non-oncologic	8,473	10,364
NC breast cancer surgery	3,163	3,974
Prostatectomy BPH	6,701	8,646
Total	38,795	48,978

Policy-wise the key will lay in understanding the situation in those healthcare areas standing as outliers, 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 Spain include:

- Local schools of practice that lead to well establish 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.

- Although, as mentioned, utilisation of LVC is more often explained by local medical practices, regions still play some role in prostatectomy in BPH and hysterectomy in non-oncologic conditions. Factors such as services availability and organisation of care devices, should be taking into account as plausible underlying factors in both procedures.

- 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.

The analysis conducted, suggests that there is room for enhancing value for money in the Spanish system. Although Spain shows relative low rates compared with the other ECHO countries, LVC utilisation have tended to remain stable over the period of analysis as well as variation not deemed random has stayed at moderate levels. Nevertheless, prostatectomy in benign hyperplasia high rates and adenoidectomy and/or tonsillectomy increasing trend would deserve special consideration.

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 healthcare area level, as well as social, 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:

International Comparison 2009

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

	Adenotonsillectomy children up to 14 years old				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	3,261	37,301	9,597	2,354	30,076
Stand. Rate	33.38	39.75	62.29	83.67	53.93
EQ5-95	3.86	2.5	3.42	2.46	4.8
SCV	0.21	0.09	0.34	0.66	0.23

	C-section in low-risk deliveries				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	5,356	26,982	1,140	1,106	9,287
Stand. Rate	43.41	20.3	4.32	21.81	8.95
EQ5-95	2.29	4.51		3.51	49.44
SCV	6.34	0.8	0.69	0.81	0.47

	Hysterectomy non-oncologic conditions				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	4,897	39,948	9,166	1,568	24,367
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	2,187	15,472	2,746	490	8,821
Stand. Rate	8.14	6.22	5.24	5	4.31
EQ5-95	1.93	1.9	2.32	3.96	3.77
SCV	0.56	0.1	0.04	0.06	0.07

	Prostatectomy benign prostatic hyperplasia				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	2,330	16,197	3,120	458	16,422
Stand. Rate	22.09	15.04	12.73	12.53	18.2
EQ5-95	4.38	3.33	3.94	6.37	4.13
SCV	0.47	0.1	0.18	0.23	0.18

Stand. Rate: Age-sex Standardised Rate per 10,000 inhabitants (Reference population: ECHO countries 2009); EQ5-95: Extremal Quotient taking as extreme values areas in the 5th and 95th percentiles; SCV: Systematic Component of Variation.

APPENDIX 2:

Spain 2009

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

	Adenoton sillectomy	C-section Low Risk Delivery	Hysterectomy Non-oncologic conditions	Non-conservative surgery breast cancer	Prostatectomy benign prostatic hyperplasia
Cases	30,076	9,287	24,367	8,821	16,422
Population	6,794,644	13,226,817	20,284,156	23,584,640	10,879,534
Crude Rate	46.36	8.27	12.87	3.89	15.82
Stand. Rate	46.66	8.58	12.91	3.85	15.62
sR Min.	7.21	0.1	2.12	0.29	2.3
sR Max.	112.64	39.8	29.72	8.53	44.01
sR. P5	18.4	0.68	6.65	2.03	7.24
sR. P25	33.85	3.11	10.54	2.93	11.1
sR. P50	44.05	6.65	12.65	3.79	14.47
sR. P75	55.17	12.09	15.08	4.64	18.63
sR. P95	87.24	23.97	19.67	6.25	27.23
EQ5-95	4.74	35.36	2.96	3.08	3.76
EQ25-75	1.63	3.88	1.43	1.59	1.68
SCV	0.21	1.26	0.11	0.08	0.18
ICC	0.13	0.07	0.22	0.09	0.16

Stand.Rate: Standardised Rate per 10,000 inhabitants (Reference population: national); sR Px: standardized rate at a percentile x of sR distribution; EQ5-95: Extremal Quotient taking as extremes areas in the 5th and 95th percentiles; SCV: Systematic Component of Variation. EQ25-t5: Extremal Quotient taking as extreme values areas in the 25th and 75th percentiles; SCV: Systematic Component of Variation; ICC: Intra-class Correlation Coefficient.

APPENDIX 2:

Spain 2009

Table 3. Excess-cases of lower-value care in Spain, year 2009, conservative scenario (benchmark the 25 percent of healthcare areas 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	13,003	7,455	8,473	3,163	6,701
EC25 min	1	1	1	1	1
EC25 max	541	351	196	83	239
Q1	552	261	442	164	355
Q2	1602	812	1218	412	710
Q3	3367	1832	2300	828	1648
Q4	7482	4550	4513	1759	3988

EC25: Excess number of cases using as benchmark percentile 25 of the distribution of standardised utilisation rate, per healthcare areas; Qx: quartile of the EC25 distribution.

Table 4. Excess-cases of lower-value care in Spain, year 2009, drastic scenario (benchmark the 10 percent of healthcare areas 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	17,557	8,437	10,364	3,974	8,646
EC10 min	1	1	1	1	1
EC10 max	633	375	213	117	321
Q1	770	233	619	227	400
Q2	2342	903	1761	485	1067
Q3	4590	2021	2645	1066	2170
Q4	9855	5280	5339	2196	5009

EC10: Excess number of cases using as benchmark percentile 10 of the distribution of standardised utilisation rate per healthcare areas; Qx: quartile of the EC10 distribution.

APPENDIX 2:

Evolution over time 2002-2009 (Spain)

Table 5

	Adenotonsillectomy							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	24,332	25,852	27,841	27,873	27,628	29,306	29,739	30,076
Stand. Rate	43.5	46.94	50.13	50.05	48.84	51.61	51.52	53.43
sR Q1.	52.15	54.71	56.82	53.29	50.24	53.92	50.87	50.56
sR Q5.	39.53	43.65	47.15	42.47	45.24	48.91	49.37	52.52
SCV	0.3	0.26	0.21	0.21	0.18	0.2	0.16	0.21

Stand. Rate & 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	8,781	9,484	9,902	9,264	9,491	10,920	11,120	9,287
Stand. Rate	8.55	9.18	9.58	9.26	9.43	11	11.25	9.12
sR Q1.	8.43	9.60	9.32	7.26	6.19	7.75	8.09	7.14
sR Q5.	7.50	7.75	8.61	9.05	9.94	12.22	12.54	8.96
SCV	1.43	1.36	1.38	1.79	1.58	1.84	1.61	1.22

Stand. Rate & 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	29,324	28,229	27,869	28,099	26,647	25,772	25,132	24,367
Stand. Rate	16.81	16.8	16.08	16.2	15.77	15.08	14.86	14.35
sR Q1.	17.44	17.08	16.28	16.70	16.07	14.60	14.49	13.83
sR Q5.	15.16	15.41	14.95	15.52	14.43	13.20	14.18	12.45
SCV	0.09	0.12	0.09	0.1	0.1	0.1	0.09	0.1

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

APPENDIX 2:

Evolution over time 2002-2009 (Spain)

Table 8

	Non-conservativeSurgery breast cancer							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	8,536	8,934	8,728	8,635	8,640	8,685	8,519	8,821
Stand. Rate	4.19	4.39	4.33	4.23	4.19	4.28	4.12	4.32
sR Q1.	4.15	4.49	4.47	4.27	4.07	4.21	4.17	4.11
sR Q5.	4.16	4.41	4.49	3.78	4.09	4.45	3.65	4.16
SCV	0.1	0.11	0.11	0.09	0.11	0.16	0.1	0.09

Stand. Rate & sR: AgeStandardised 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	16,924	16,556	16,673	16,029	15,380	16,172	16,585	16,422
Stand. Rate	19	18.71	18.46	17.73	17.55	17.91	18.27	18.69
sR Q1.	16.10	16.22	16.52	15.70	14.31	15.52	13.90	15.40
sR Q5.	19.59	20.46	20.16	18.20	19.69	18.71	20.68	20.23
SCV	0.18	0.17	0.13	0.16	0.2	0.16	0.2	0.18

Stand. Rate & 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:

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 when 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 through out 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 ecological study, each admission was allocated to the place of residence of the patient, which in turn is referred to a meaningful geographic unit – the 199 Healthcare Areas and the 17 Regions composing the Spanish National Health System.

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, as proposed by AHRQ and OECD. 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, cross-walking across different diseases 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 National Discharges Dataset (CMBD). Cross- and in-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 Atlas VPM dataset, after original data by La Caixa 2003 annual report

APPENDIX 4:

Indicators' definition

	Diagnosis and Procedures codes ICD9-CM					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Non-conservative surgery in breast cancer Women	85.33 85.34 85.35 85.36 85.41 85.42 85.43 85.44 85.45 85.46 85.47 85.48				174.* 233.0 V10.3	
Prostatectomy in prostate cancer Male population aged 40 or older	185.* 233.4 236.5				60.21 60.29 60.3 60.4 605 60.61 60.62 60.69	
Prostatectomy in benign prostatic hyperplasia Male population aged 40 or older	60.0				60.3 60.4 60.5 60.6	

	Diagnosis and Procedures codes ICD9-CM					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Births with complications (CB) Women Aged between 15 and 55	641.11 641.21 641.31 641.81 641.91 642.01 642.51 642.61 642.71 644.20 644.21 646.61 651.00 651.01 651.03 651.10 651.11 651.13 651.20 651.21 651.23 651.30 651.31 651.33 651.40 651.41 651.43 651.50 651.51 651.53 651.60 651.61 651.63 651.80 651.81 651.83 651.90 651.91 651.93 652.20 652.21 652.23 652.30 652.31 652.33 652.40 652.41 652.43 652.60 652.61 652.63 652.71 654.01 654.11 654.20 654.21 654.23 654.31 654.41 654.51 654.61 654.71 656.31 656.40 656.41 656.43 656.81 658.11 658.21 659.01 659.11 659.31 660.01 660.11 660.21 660.31 660.41 660.50 660.51 660.53 660.61 660.71 660.81 660.91 662.30 662.31 662.33 663.01 663.11 663.21 665.01 665.11 665.31 668.01 668.11 669.01 669.11 669.61 668.10 668.11 668.13 042 649.8*		641.11 641.21 641.31 641.81 641.91 642.01 642.51 642.61 642.71 644.20 644.21 646.61 651.00 651.01 651.03 651.10 651.11 651.13 651.20 651.21 651.23 651.30 651.31 651.33 651.40 651.41 651.43 651.50 651.51 651.53 651.60 651.61 651.63 651.80 651.81 651.83 651.90 651.91 651.93 652.20 652.21 652.23 652.30 652.31 652.33 652.40 652.41 652.43 652.60 652.61 652.63 652.71 654.01 654.11 654.20 654.21 654.23 654.31 654.41 654.51 654.61 654.71 656.31 656.40 656.41 656.43 656.81 658.11 658.21 659.01 659.11 659.31 660.01 660.11 660.21 660.31 660.41 660.50 660.51 660.53 660.61 660.71 660.81 660.91 662.30 662.31 662.33 663.01 663.11 663.21 665.01 665.11 665.31 668.01 668.11 669.01 669.11 669.61 668.10 668.11 668.13 042 649.8*		
Cesarean section rate Women Aged between 15 and 55 years old					74.0 74.1 74.2 74.4 74.99	74.91

	Diagnosis and Procedures codes ICD9-CM					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Cesarean section rate in low risk deliveries Women Aged between 15 and 55 years old		641.11 641.21 641.31 641.81 641.91 642.01 642.51 642.61 642.71 644.20 644.21 646.61 651.00 651.01 651.03 651.10 651.11 651.13 651.20 651.21 651.23 651.30 651.31 651.33 651.40 651.41 651.43 651.50 651.51 651.53 651.60 651.61 651.63 651.80 651.81 651.83 651.90 651.91 651.93 652.20 652.21 652.23 652.30 652.31 652.33 652.40 652.41 652.43 652.60 652.61 652.63 652.71 654.01 654.11 654.20 654.21 654.23 654.31 654.41 654.51 654.61 654.71 656.31 656.40 656.41 656.43 656.81 658.11 658.21 659.01 659.11 659.31 660.01 660.11 660.21 660.31 660.41 660.50 660.51 660.53 660.61 660.71 660.81 660.91 662.30 662.31 662.33 663.01 663.11 663.21 665.01 665.11 665.31 668.10 668.11 668.13 669.01 669.11 669.61 042 649.8*		641.11 641.21 641.31 641.81 641.91 642.01 642.51 642.61 642.71 644.20 644.21 646.61 651.00 651.01 651.03 651.10 651.11 651.13 651.20 651.21 651.23 651.30 651.31 651.33 651.40 651.41 651.43 651.50 651.51 651.53 651.60 651.61 651.63 651.80 651.81 651.83 651.90 651.91 651.93 652.20 652.21 652.23 652.30 652.31 652.33 652.40 652.41 652.43 652.60 652.61 652.63 652.71 654.01 654.11 654.20 654.21 654.23 654.31 654.41 654.51 654.61 654.71 656.31 656.40 656.41 656.43 656.81 658.11 658.21 659.01 659.11 659.31 660.01 660.11 660.21 660.31 660.41 660.50 660.51 660.53 660.61 660.71 660.81 660.91 662.30 662.31 662.33 663.01 663.11 663.21 665.01 665.11 665.31 668.10 668.11 668.13 669.01 669.11 669.61 042 649.8*	74.0 74.1 74.2 74.4 74.99	74.91 72.* 73.* 75.*

	Diagnosis and Procedures codes ICD9-CM					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Hysterectomy in uterus cancer (CB) Women	179 180 182 233.1 233.2		179 180 182 233.1 233.2		68.3 68.4 68.5 68.6 68.7 68.8 68.9	
Hysterectomy without uterus cancer diagnosis Women Aged 18 or older		Cancer in female genital organs or uterus. Abdominal trauma (Annex 7) 630-677		Cancer in female genital organs or uterus. Abdominal trauma (Annex 7) 630-677	68.3 68.4 68.5 68.6 68.7 68.8 68.9	
Adenoidectomy and/or Tonsillectomy Population Aged 14 and younger					28.2 28.3 28.6	