ECHO

EUROPEAN COLLABORATION FOR HEALTHCARE OPTIMIZATION

Lower Value Care in Slovenia

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 (organisational and financial incentives)

- With the exception of adenotonsillectomy and c-section in low risk births, utilisation rates of lower-value care in Slovenia are moderate or low compared to other ECHO countries. In terms of volume, C-section in low risk deliveries and hysterectomies 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- Those superseded by more cost-effective alternatives (non-conservative breast cancer surgery, Hysterectomy in non-oncologic conditions);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 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

- Though variation is significant for all LVC procedures examined, the systematic component of it is particularly large for certain ones, such as c-section in low risk deliveries and prostatectomy in BPH, while for others -hysterectomy or non-conservative breast surgery-, the behaviour across statistical regions seems to be quite homogeneous, with a bare 5 to 8% of the observed differences deemed beyond those randomly expected

- The highest quintile of adeno/tonsillectomy standardised utilisation rates includes statistical regions around 120 interventions per 10,000 children while the lowest goes from 54 to 65. The geographic pattern seems to point out a certain concentration of high rates in the east and south west; the central band of the country seems to cluster the lowest rates

- Regarding c-section in low risk births, the conclusion that can be drawn is that the intensity of c-section performance in several statistical regions in the country seems to be driven by factors other than need. For instance, Savinjska with the lowest relative risk of complicated births, stands out as one of the populations more exposed to c-section and displays the highest intensity of use of c-section for low risk births. Conversely, Gorenjska, with high relative risk of complicated births, ranks among the lowest intensity of c-section use in the country, and an intermediate level for the lower value indication of the procedure.

- Depending on their statistical region of residence women face up to a 4-folded probability of undergoing lower-value breast surgery (table 2 appendix 2). Only 7% of this variation exceeds what could be randomly expected.

- Slovenia shows the lowest prostatectomy rate in BPH across ECHO countries (see section II) but variation within the country is relevant, covering an array from about 1 in 3500 men to 1 in 455, depending on the statistical region of residence (Fig. 30); this translates into men living in a top utilisation statistical region bearing almost 8 times more probabilities to get their prostate removed than those residents in a bottom rate place. Such differences are hardly amenable to differences in need. Almost 30% of this variation exceeds what could be randomly expected.

- LVC utilisation rates have tended to remain low/moderate or slightly decrease since 2005. The exception regards adeno/tonsillectomy and c-section in low risk births for which Slovenia shows among the highest rates in ECHO; for them, utilisation has even increased over the period of analysis while systematic variation declined signalling that population exposure to

these two types of lower-value care has become more homogeneously severe across statistical regions over time

- No significant differences in population exposure to lower-value care were amenable to the average income level of their statistical region of residence
- The analysis conducted, suggests that there is some room for enhancing value for money in the Slovenian system. Although Slovenia shows low rates compared with the other ECHO countries, C-section in low risk births and Adeno/tonsillectomy high rates and increasing trend deserve special consideration. 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 statistical region level, as well as social, organisational and budgetary local contexts, 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 Slovenia 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 (Statistical regions for Slovenia) .

Adenoidectomy and/or tonsillectomy

Slovenia shows the highest standardised rates of adeno/tonsillectomy across ECHO countries (*Fig 1a*); overall around 1 in 120 children below 14 years old underwent the procedure in 2009 i.e. almost 3 times the number at the country with the lowest rate – 1 in 300 Danish children were intervened in 2009 *(table 1 in Appendix 1).*

The ratio between the highest and lowest rates in Slovenia is moderate for ECHO countries: there is more tan twice the chances of getting the procedure for children living in high rate regions; Spain and Denmark show larger differences, close to 4 or 5-fold. *(Fig 1b. See also table 1 in Appendix 1),* while England also remains in the area of 2.5-folded probabilities comparing children living at high intensity areas to those at low. The systematic component of this variation has proven relevant in all countries examined, ranging from 9 to 66 % beyond what would be randomly expected.

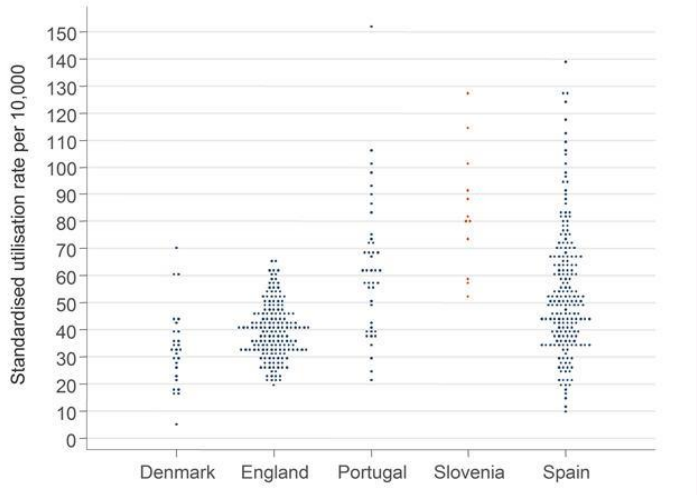


Figure 1a. Standardised rates of adenoidectomy and/or tonsillectomy per 10,000 children (natural scale). Year 2009

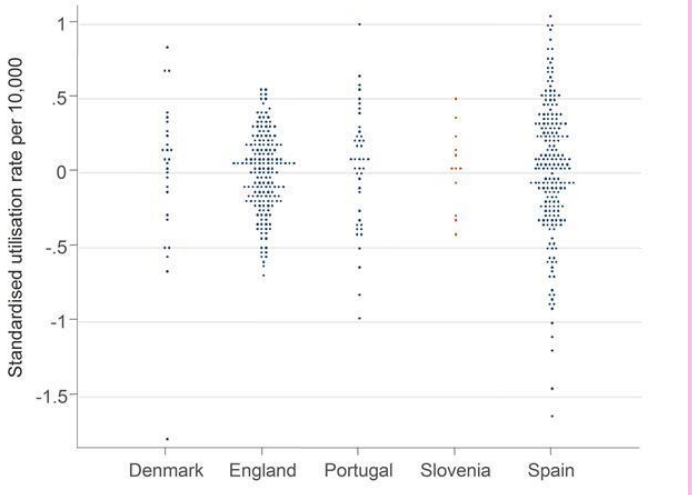


Figure 1b. Standardised rates of adenoidectomy and/or tonsillectomy per 10,000 children (normalized scale). Year 2009

** Each dot represents the relevant administrative area in the country (Statistical Regions for Slovenia). 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.*

Caesarean section in low risk pregnancies and deliveries

Slovenia shows the second highest age-standardised C-section rate in low risk births across ECHO countries, half the Danish and very similar to England, while 5 and 3-folding Portuguese and Spanish *(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 Slovenia, women living in those regions with highest rates stand a 2.5-folded probability of bearing a c-section in a low risk birth when compared to residents in areas with the lowest rates. Spanish healthcare areas, on the other hand, show a much higher degree of variation, ranging between null cases and figures rising close to those found in Danish kommuners *(Fig 2b and table 1 in Appendix 1)*. The systematic component of this variation is also large across the countries examined, exceeding what was expected by chance in a range from 50% to more than 6 times *(Fig 2. b and table 1 in Appendix)*.

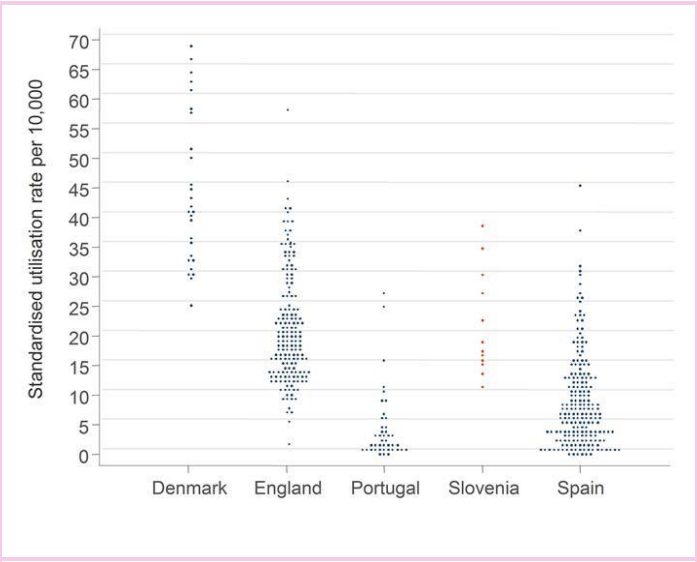


Figure 2a. Standardised Rates of C-Section in low-risk cases per 10,000 women in reproductive age (natural scale) . Year 2009

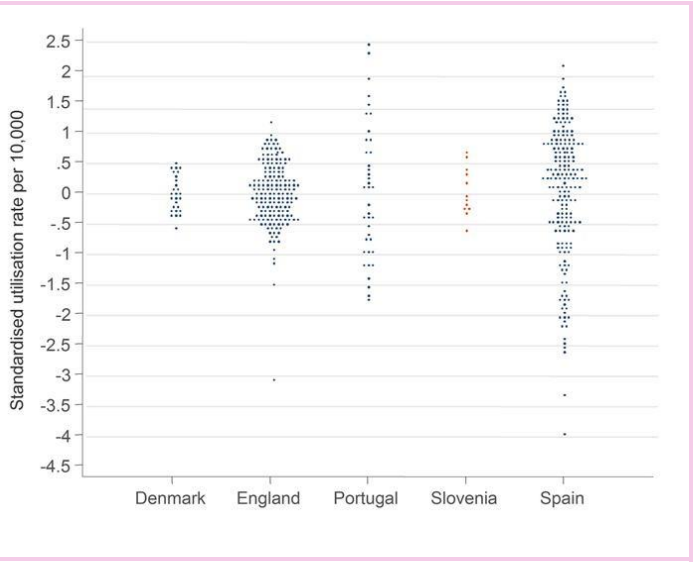


Figure 2b. Standardised Rates of C-Section in low-risk cases per 10,000 women in reproductive age (normalised scale) . Year 2009

** Each dot represents the relevant administrative area in the country (Statistical Regions for Slovenia). 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

Slovenia shows the second lowest rate of hysterectomy in non-oncologic conditions (one in 550 adult women in a year); close to the English rate, this figure is middle way between those observed in the country with the highest rate, Denmark –1 in 458 women- and the country with the lowest, Spain -one in 677 women *(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 14.77 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.

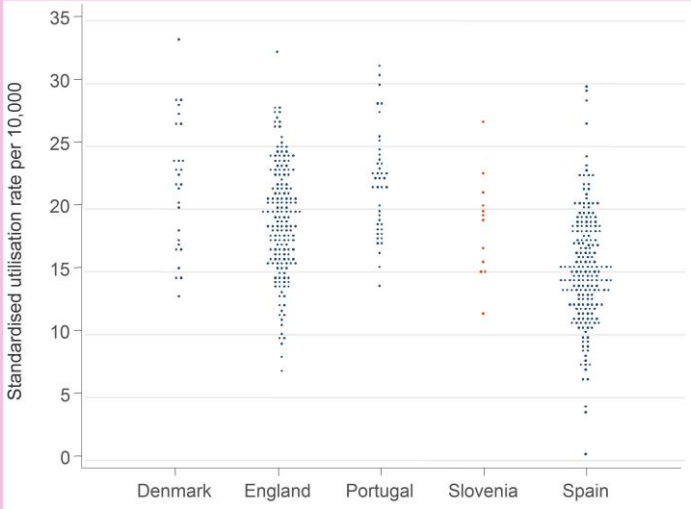


Figure 3a. Standardised Rates of Hysterectomy in non-oncologic conditions per 10,000 women. (natural scale) . Year 2009

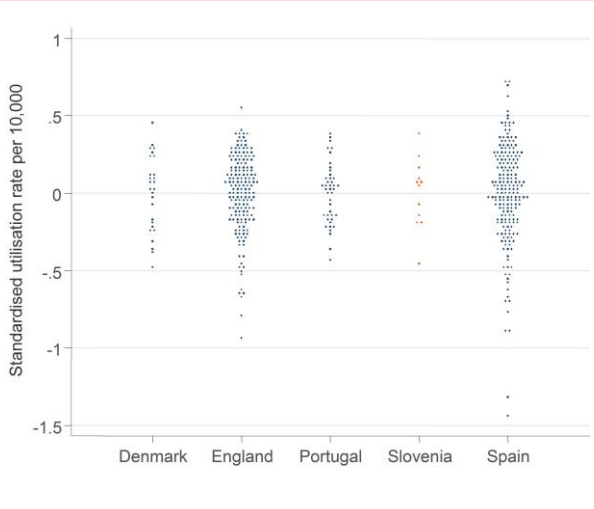


Figure 3b. Standardised Rates of Hysterectomy in non-oncologic conditions per 10,000 women. (normalised scale) . Year 2009

** Each dot represents the relevant administrative area in the country (Statistical Regions for Slovenia). 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 rate of non-conservative breast surgery in Slovenia is aligned with the utilisation in Portugal and Spain (5 per 10,000 women) and far from the Danish rate, 8.14 per 10,000 women *(Figure 4a and table 1 Appendix 1)*. In addition, women living in those Slovenian regions with the highest rates bear four times the probability of getting non-conservative surgery than those living at the bottom of the utilisation range; the same is true for Spanish women; the differences stood by women in Portugal, Denmark and England depending on their area of residence go down to twice *(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)*.

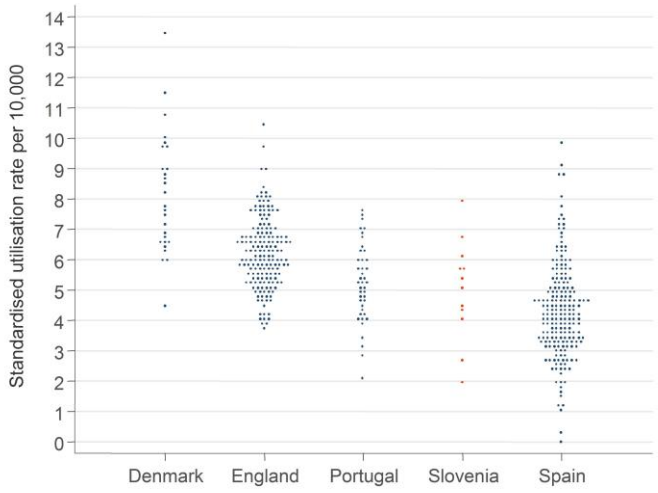


Figure 4a. Standardised Rates of non conservative surgery in breast cancer per 10,000 women (natural scale) . Year 2009

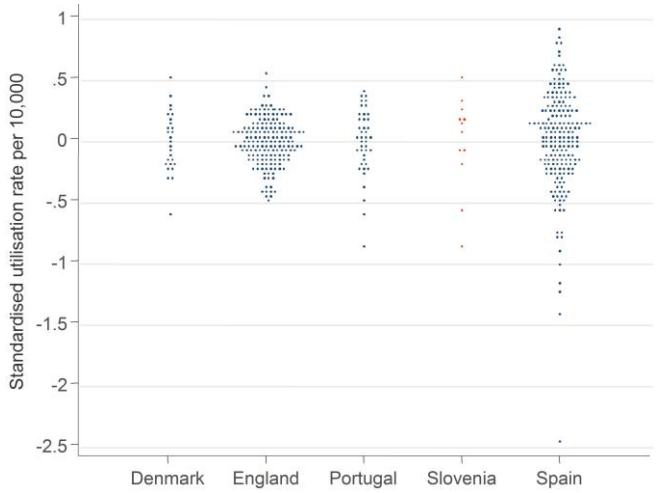


Figure 4b. Standardised Rates of non conservative surgery in breast cancer per 10,000 women (normalised scale) . Year 2009

** Each dot represents the relevant administrative area in the country (Statistical Regions for Slovenia). 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

Slovenia shows, the lowest age-standardised rate of prostatectomy in BPH -1 intervention in 800 adult men each year, very similar to Portugal and far from the numbers observed in those countries with the highest rates, Denmark and Spain, around 1 in 500 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 *(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.

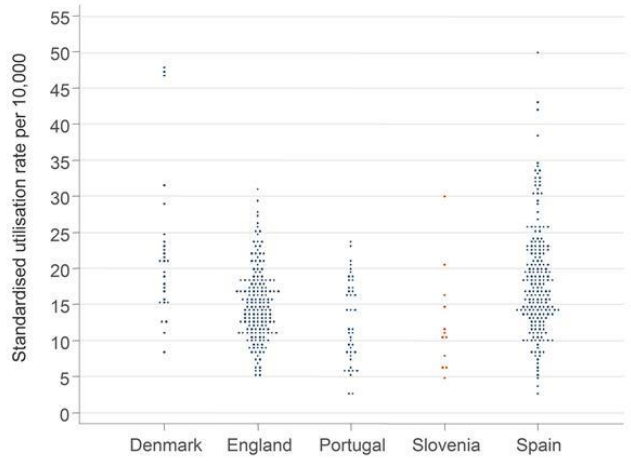


Figure 5a. Standardised Rates of prostatectomy in BPH per 10,000 men (natural scale) . Year 2009

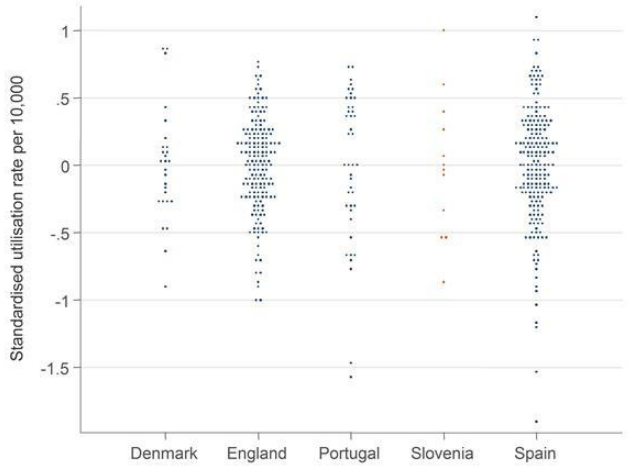


Figure 5b. Standardised Rates of prostatectomy in BPH per 10,000 men (normalised scale) . Year 2009

** Each dot represents the relevant administrative area in the country (Statistical Regions for Slovenia). 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 4b 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 adenotonsillectomy and c-section in low risk births, utilisation rates of lower-value care in Slovenia are moderate or low compared to other ECHO countries. In terms of volume, C-section in low risk deliveries and 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, the systematic component of it is particularly large for certain ones, such as c-section in low risk deliveries and prostatectomy in BPH, while for others -hysterectomy or non-conservative breast surgery-, the behaviour across statistical regions seems to be quite homogeneous, with a bare 5 to 8% of the observed differences deemed beyond those randomly expected.

Along the following pages, the geographical pattern of utilisation for each procedure will be presented, mapping out the relevant tiers in the health system organisation: the 12 statistical regions and 2 cohesion 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 statistical region with the lowest rate (10% of the 12 regions); the other scenario, more conservatively, benchmarks against the 3 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, regions may still play some role in other factors such as services availability and organisation of care devices which may affect decisions made locally.

Variation in utilisation of each LVC procedure is represented using two geographical units: Statistical Regions and regions. The first mapping is composed of 12 units and the second comprises 2 regions. Analysis by Statistical Regions would be more linked to local medical practices, whilst regions could be considered a surrogate for regional policies affecting all the Statistical Regions within.

Adenoidectomy and/or tonsillectomy

The highest quintile of age-standardised utilisation rates includes statistical regions around 120 interventions per 10,000 children while the lowest goes from 54 to 65. The geographic pattern seems to point out a certain concentration of high rates in the east and south west; the central band of the country seems to cluster the lowest rates (pale areas in figure 6).

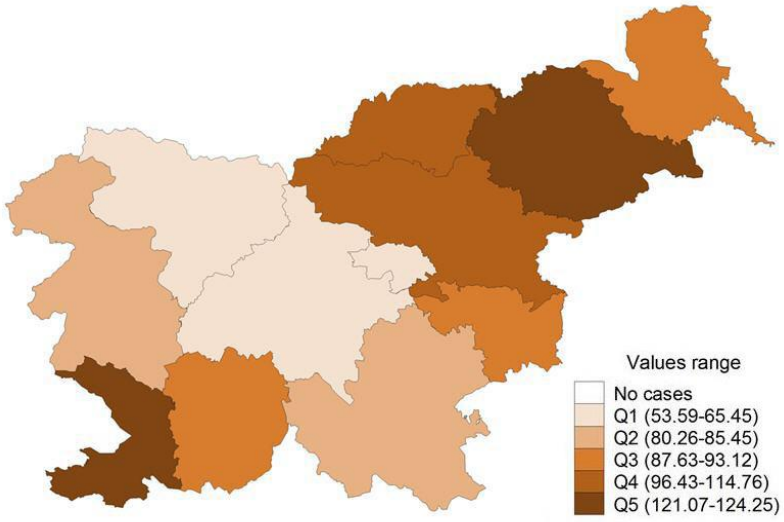


Figure 6. Age-sex standardised adenoidectomy and/or tonsillectomy utilisation rate per 10,000 children up to 14 years old. 12 Statistical Regions. Year 2009

** The darker the brown, the higher the exposition to adenotonsillectomy of children living there. Statistical Regions 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 cohesion region, Vzhodna Slovenija shows clearly higher rates, though differences are, logically, much more attenuated in figure 7 than they were in 6 where the full range of variation within the regions was displayed rather than smoothed out.

Figure 7. Age-sex standardised adeno and/or tonsillectomy utilisation rate per 10,000 children up to 14 years old. 2 cohesion regions. Year 2009

Therefore, the larger opportunities for minimising the use of adenotonsillectomy are to be found also in the east-south part of the country *(figures 8 and 9)*. In the most conservative scenario, those areas more in need of intervention to decrease utilisation would be performing up to 272 adenotonsillectomy in excess per year (274 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 802, of those around 650 are concentrated in Vzhodna Slovenija *(table 3 in Appendix 1)*

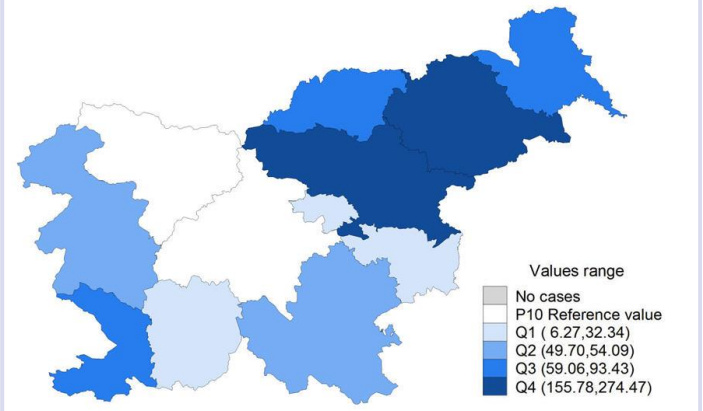


Figure 8.a. Excess cases adenotonsillectomy per Statistical Regions. Scenario I minimisation to p10. 12 Statistical Regions.

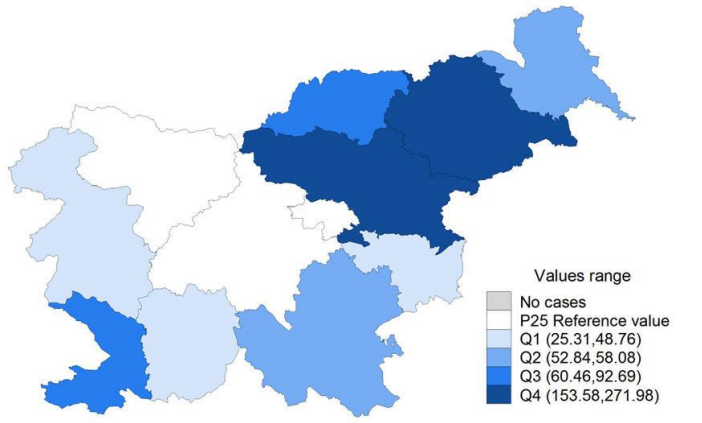


Figure 8.b. Excess cases adenotonsillectomy per Statistical Regions. Scenario II minimisation to p25. 12 Statistical Regions.

** 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 Statistical Regions with the lowest utilisation rates –p10 and p25). Statistical Regions 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. 2 cohesion regions. Year 2009

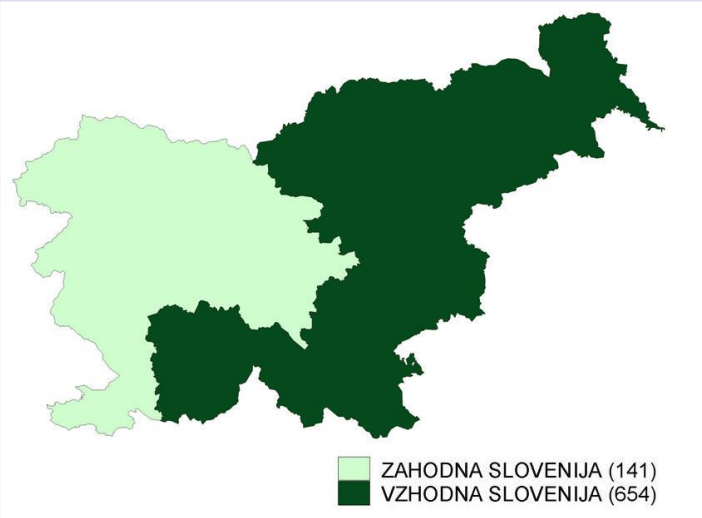


Figure 9.b. Excess cases adenotonsillectomy. Scenario II minimisation to p25. 2 cohesion regions. Year 2009

** The darker the green the larger the number of excess cases estimated at region level, if all the statistical regions 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 Slovenia 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 statistical regions, both in absolute terms (standardised rates) and expressed in relative risk of exposure (ratio observed to expected). Excess incidence of this condition seems to concentrate in Pomurska, Korosca and Podravska -20 to 50% excess risk- and with less intensity in Gorenjska and Goriska (20% more relative risk) *(blue shades in figure 10)*

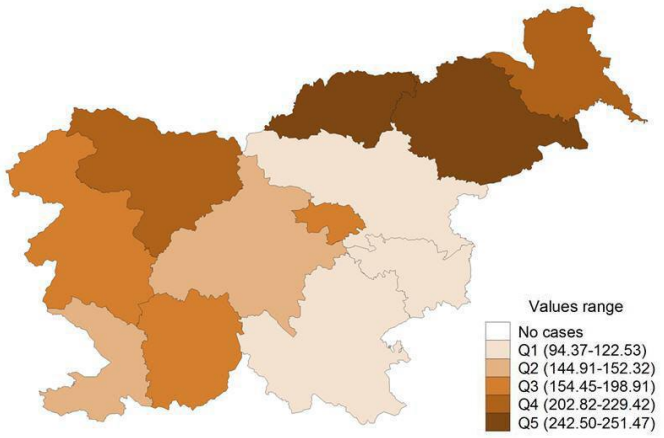


Figure 9. Age standardised Births with complications rate per 10,000 women. 12 Statistical Regions. Year 2009

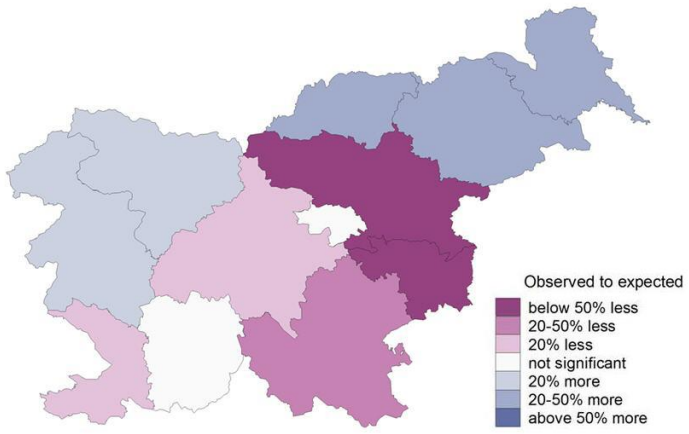


Figure 10. Admissions Ratio Observed/expected Births with complication. 12 Statistical Regions. Year 2009

** Map on the right: The darker the brown, the higher the risk of complications among women living there. Statistical regions 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 statistical region 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 some 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 statistical regions in the country seems to be driven by factors other than need. For instance, Savinjska with the lowest relative risk of complicated births, stands out as one of the populations more exposed to c-section and displays the highest intensity of use of c-section for low risk births). Conversely, Gorenjska, with high relative risk of complicated births ranks among the lowest intensity of c-section use in the country, and an intermediate level for the lower value indication of the procedure.

Exploring the degree of overlapping between c-section utilisation patterns and c-section in low risk deliveries (lower value care), Pomurska and Podravska show a moderately high utilisation of c-section and among the lowest exposure to lower-value interventions *(figures 11 and 12)*. In most regions displaying high c-section rates women seem to bear a higher rate of lower-value care. However, it is also worth noting that there are also areas with low-medium intensity of c-section use (Obalno-kraska) that seem to suffer high levels of exposure to lower-value interventions.

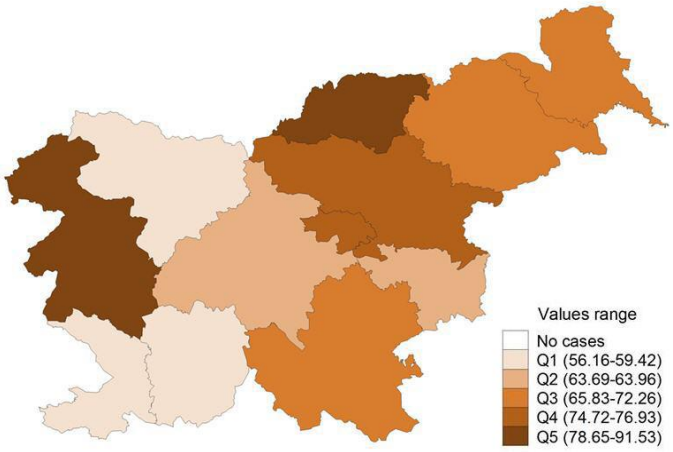


Figure 11. Age standardised c-section rate per 10,000 women aged 15-55. 12 Statistical Regions. Year 2009

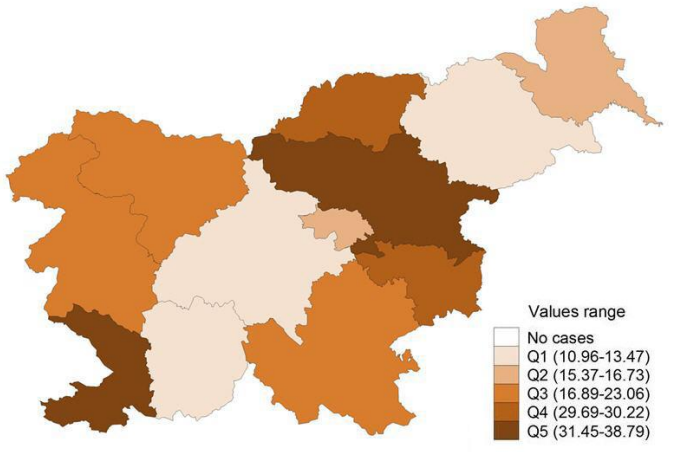


Figure 12. Age standardised c-section rate in low risk deliveries per 10,000 women aged 15-55. 12 Statistical Regions. Year 2009

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

The ratio across areas in the extremes of the utilisation range goes above 3-fold probability of undergoing a c-section during a low risk delivery (table 2 appendix 2); 20% of this variation cannot be deemed random

When the same analysis is conducted at regional level, the mismatching between burden of births with complications and intensity in use of c-section smoothes out (figures 13 to 15), indicating that the intensity of use is mainly related to local practices.

Figure 13. Age standardised Births with complications rate per 10,000 women. 2 regions. Year 2009

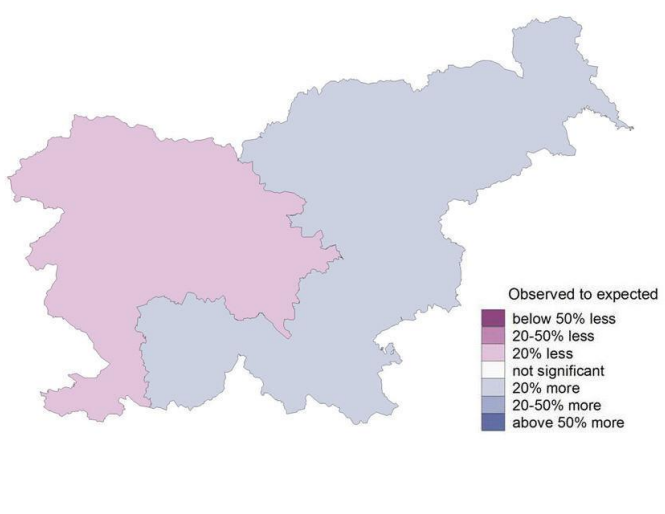


Figure 14. Admissions Ratio Observed/expected Births with complication. 2 regions. Year 2009

** 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. 2 regions. Year 2009

Figure 16. Age standardised c-section rate in low risk deliveries per 10,000 women aged 15-55. 2 regions. Year 2009

The distance between the observed exposure to lower value c-sections and the optimisation benchmarks is drawn in figures 17 and 18 for the two tiers of administration, statistical and cohesion regions.

The most conservative scenario of minimisation (figures 17.b and 18. b) quantifies the excess lower value c-sections in Slovenia in a year in 415 interventions (table 3 appendix 2). The distribution of those cases is, obviously, uneven across statistical regions; figures 17.a and 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 60 and 195 interventions per year –Q4 in figures 17.a and b)

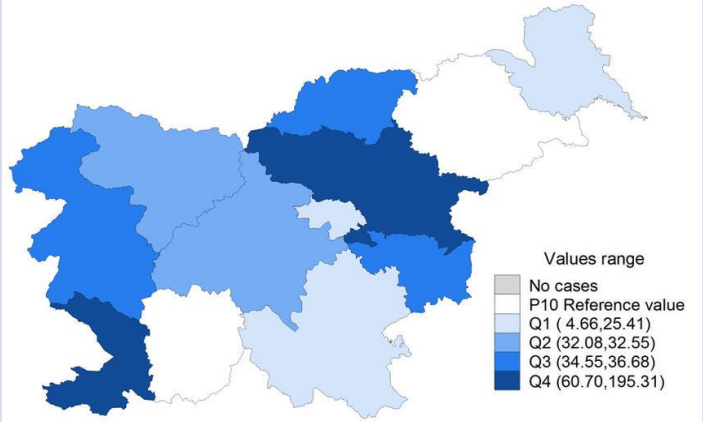


Figure 17.a. Excess cases c-section in low risk deliveries per Statistical Region. Scenario I minimisation to p10. 12 Statistical Regions. Year 2009

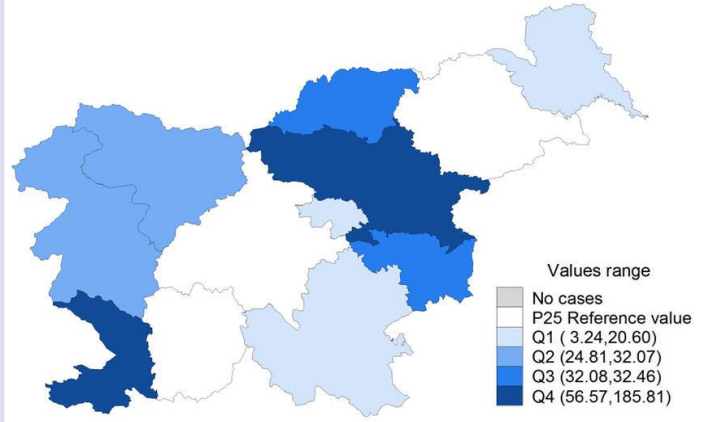


Figure 17.b. Excess cases c-section in low risk deliveries per Statistical Region. Scenario II minimisation to p25. 12 Statistical Regions. Year 2009

** 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 Statistical Regions with the lowest utilisation rates –p10 and p25). Statistical Regions 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 b). The estimates of regional impact in potentially avoidable cases goes between 288 and 314 per year for Vzhodna Slovenija, and from 113 to 162 for Zahodna Slovenija, depending on the minimising scenario

Figure 18.a. Excess cases c-section in low risk deliveries
Scenario I minimisation to p10. 2 regions. Year 2009

Figure 18.b. Excess cases c-section in low risk deliveries.
Scenario II minimisation to p25. 2 regions. Year 2009

** The darker the green the larger the number of excess cases estimated at region level, if all the statistical regions 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 the two types of hysterectomy indication across statistical regions in Slovenia

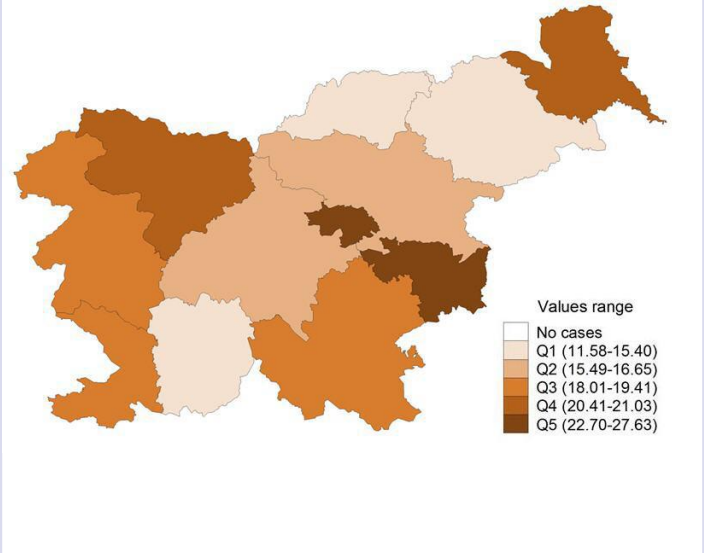


Figure 19. Age-standardised Hysterectomy non-oncologic diagnosis utilisation rate per 10,000 women aged 18 years or older. 12 Statistical Regions. Year 2009

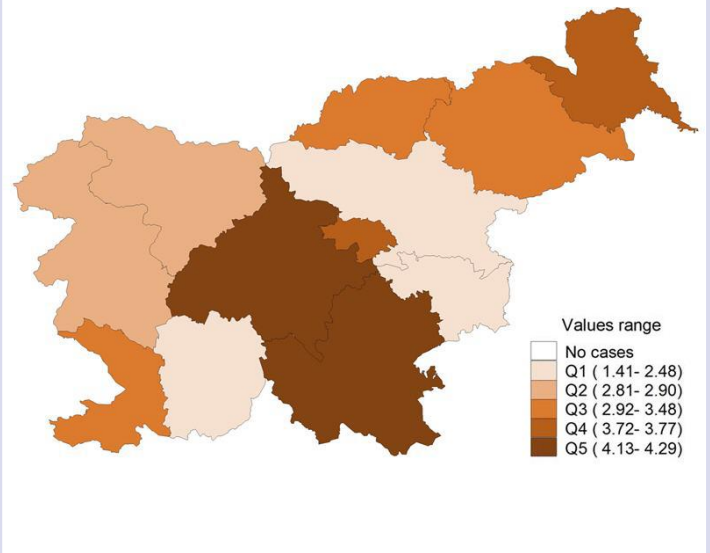


Figure 20. Age-standardised Hysterectomy in uterus cancer utilisation rate per 10,000 women. 12 Statistical Regions. Year 2009

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

Figure 21. Age-standardised Hysterectomy non-oncologic diagnosis utilisation rate per 10,000 women aged 18 years or older. 2 regions. Year 2009

Figure 22 Age-standardised Hysterectomy in uterus cancer utilisation rate per 10,000 women. 2 regions. Year 2009

It is worth noting that utilisation rates for the lower-value indication are significantly higher overall than for the adequate one (statistical regions with highest hysterectomy utilisation rates in the cancer indication score 4 procedures per 10,000 adult women, escalating to 23 to 28 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 more than 2 times, depending on their statistical region of residence (table 2, appendix 2). Only 5 % of this variation can be deemed not random (systematic).

Using regions as the unit of analysis (figures 21 and 22), the highest rates of both cancer and lower-value hysterectomy indications coexist in Zahodna Slovenija. The range of variation across regions is very low for both types of hysterectomy.

The potential for minimisation of lower-value hysterectomy use at statistical region-level is summarised in figures 22 and 23, using the two usual scenarios: The most conservative one, using as benchmark the areas in the lowest quartile of rates, yields a range of excess cases per statistical region from 9 to 54 per year.

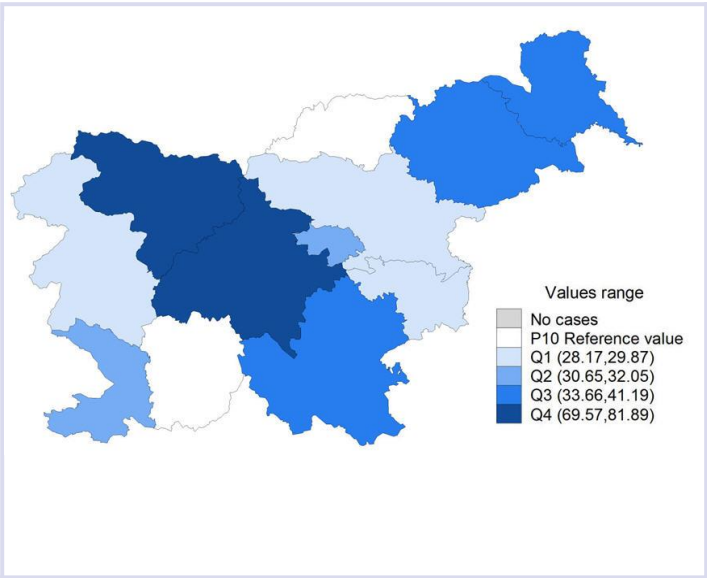


Figure 22. Excess cases Hysterectomy without uterus cancer diagnosis per Statistical Region. Scenario I minimisation to p10. 12 Statistical Regions. Year 2009

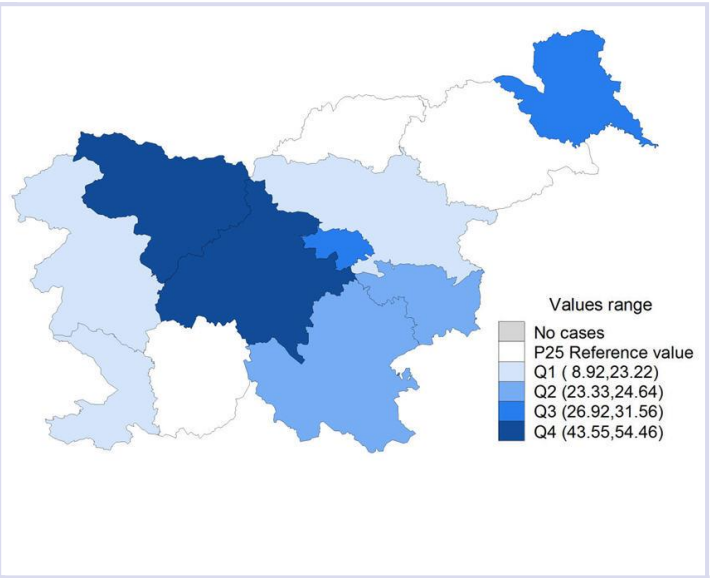


Figure 23. Excess cases Hysterectomy without uterus cancer diagnosis per Statistical Region. Scenario II minimisation to p25. 12 Statistical Regions. Year 2009

** 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 Statistical Regions with the lowest utilisation rates –p10 and p25). Statistical Regions 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, Zahodna Slovenija shows the larger potential for avoiding excess cases in the range of 140 to 212 cases per year, not far from Vzhodna with some 115-199 lower-value hysterectomies in excess per year (figures 24 and 25)

Figure 24. Excess cases Hysterectomy without uterus cancer diagnosis. Scenario I minimisation to p10. 2 regions. Year 2009

Figure 25. Excess cases Hysterectomy without uterus cancer diagnosis. Scenario II minimisation to p25. 2 regions. Year 2009

** The darker the green the larger the number of excess-cases estimated at region level, if all the statistical regions 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 Slovenia shows one of the lowest NCS utilisation rate across ECHO countries, figure 26 shows how the national rate translates onto individual statistical regions.

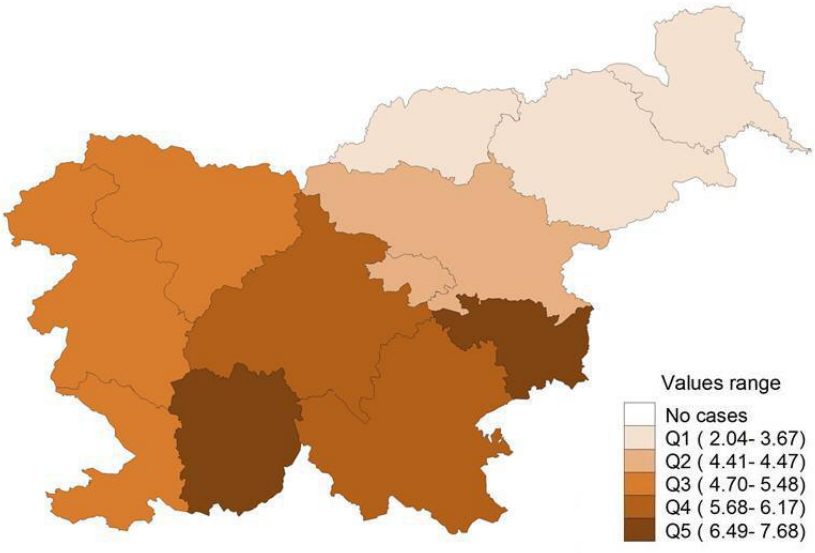


Figure 26. Age-standardised Non conservative surgery in breast cancer utilisation rate per 10,000 women. 12 Statistical Regions. Year 2009

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

Depending on their statistical region of residence women face up to a 4-folded probability of undergoing lower-value breast surgery (table 2 appendix 2). Only 7% of this variation exceeds what could be randomly expected.

The analysis at regional level points out Zahodna Slovenija with the higher NCS utilisation rate, barely above Vzhodna Slovenija: roughly 1 in 2000 adult women

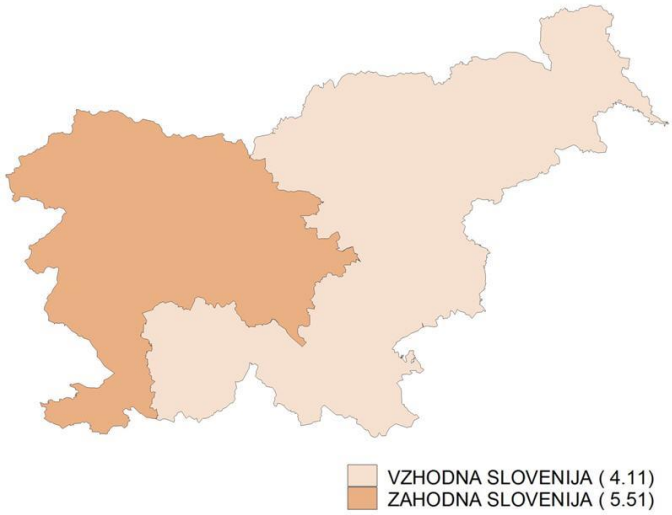


Figure 27. Age-standardised Non conservative surgery in breast cancer utilisation rate per 10,000 women. 2 regions. Year 2009

An estimation of the local potential for minimising the utilisation of NCS shows that, women are bearing an excess of this lower-value care in between 4 and 76 excess cases in a year depending on their statistical region of residence *(figures 28.a and b)*. The same analysis performed at regional level *(figures 29.a and b)* yields that the excess of NCS in Vzhodna Slovenija would be in the area of 76-83 while Zahodna Slovenija moves between 133 and 140 excess lower-value interventions per year

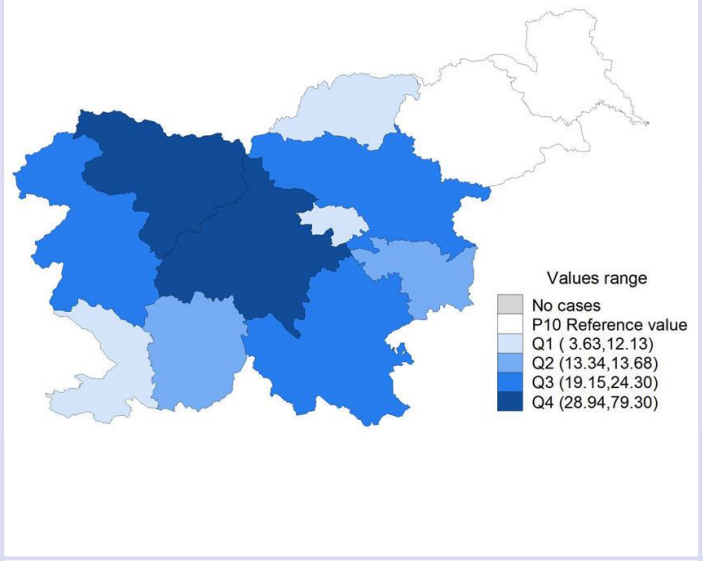


Figure 28.a. Excess cases Non conservative surgery in breast cancer. Scenario I minimisation to p10. 12 Statistical Regions.

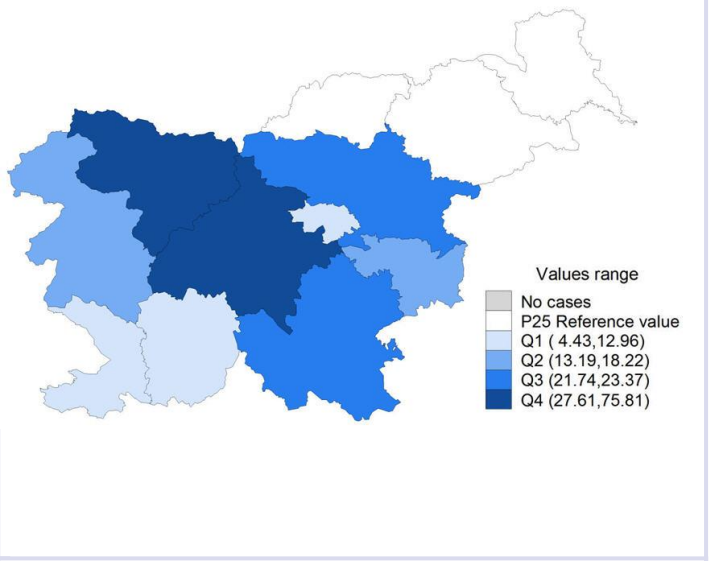


Figure 28.b. Excess cases Non conservative surgery in breast cancer. Scenario II minimisation to p25. 12 Statistical Regions.

** 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 Statistical Regions with the lowest utilisation rates –p10 and p25). Statistical Regions 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. 2 regions. Year 2009

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

** The darker the green the larger the number of excess-cases estimated at region level, if all the statistical regions 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 minor cases.

Slovenia shows the lowest prostatectomy rate in BPH across ECHO countries (see section II) but variation within the country is relevant, covering an array from about 1 in 3500 men to 1 in 455, depending on the statistical region of residence (Fig. 30); this translates into men living in a top utilisation statistical region bearing almost 8 times more probabilities to get their prostate removed than those residents in a bottom rate place. Such differences are hardly amenable to differences in need. Almost 30% of this variation exceeds what could be randomly expected.

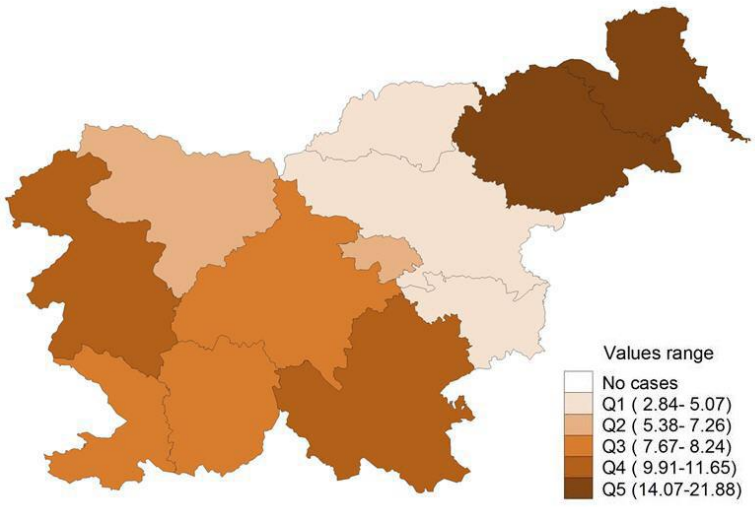


Figure 30. Age-standardised Prostatectomy in benign prostatic hyperplasia utilisation rate per 10,000 male aged 40 or older. 12 Statistical Regions. Year 2009

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

Figure 31. Age-standardised Prostatectomy in benign prostatic hyperplasia utilisation rate per 10,000 male aged 40 or older. 2 regions. Year 2009

The estimation of excess cases in a year per statistical region *(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 cases that could be avoided would range in between 1 and 11, for the statistical regions already in lower utilisation intensity, and from 52 to 79 in a year for those more prone to use it.

The impact at cohesion region level for both scenarios *(figures 33.a and b)* yield a minimum 90 excess cases in Zahodna Slovenija up to more than 150 in Vzhodna Slovenija. Overall some 249 to 254 excess cases in a year at country level

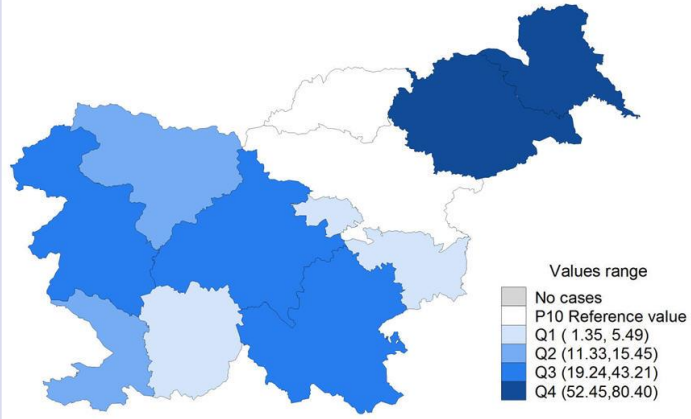


Figure 32.a. Excess cases Prostatectomy in benign prostatic hyperplasia per Statistical Region. Scenario I minimisation to p10. 12 Statistical Regions. Year 2009

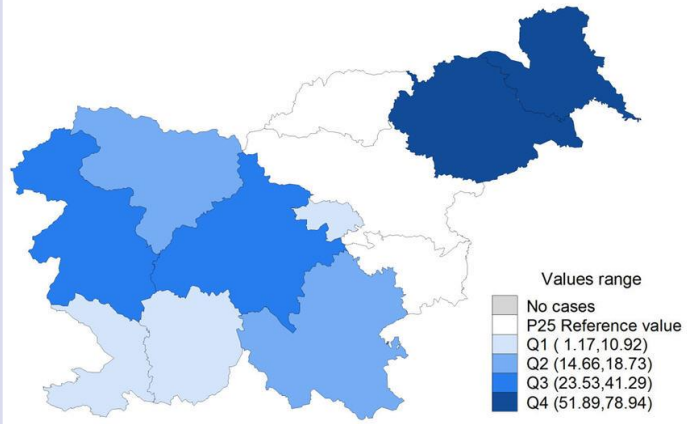


Figure 32.b. Excess cases Prostatectomy in benign prostatic hyperplasia per Statistical Region. Scenario II minimisation to p25. 12 Statistical Regions. Year 2009

** 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 Statistical Regions with the lowest utilisation rates –p10 and p25). Statistical Regions 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. 2 regions. Year 2009

Figure 37.b. Excess Prostatectomy in benign prostatic hyperplasia. Scenario II minimisation to p25. 2 regions. Year 2009

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

IV. EVOLUTION OVER TIME

LVC utilisation rates were already moderate/low for ECHO standards and they have tended to remain there or decrease since 2005.

The exception regards adeno/tonsillectomy and c-section in low risk births, for which Slovenia shows among the highest rates in ECHO; for them, utilisation has even increased over the period of analysis while systematic variation declined, signalling that population exposure to these two types of lower-value care has become more homogeneously severe across statistical regions over time

Between 2005 and 2009, utilisation rates of lower-value care show different trends depending on the procedure, but the general feature seem to be relative stability in the rates over the period (fig 38 and 39): in many cases it has even declined (22% in prostatectomy BPH or almost 8% hysterectomy).

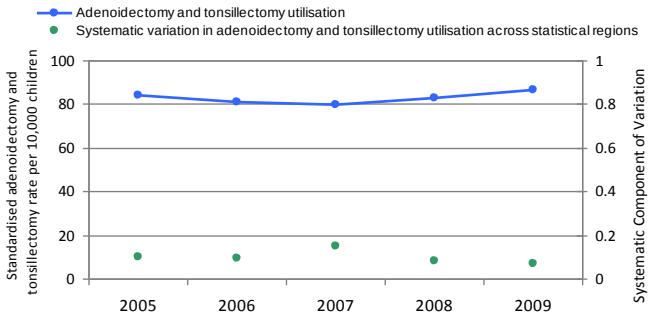
The 28% increase in lower-value c-section is remarkable (reaching the second highest ECHO rate), together with the fact that the attached systematic variation across statistical regions has almost halved over the period of analysis. The slight increase in Adeno/tonsillectomy use (3.5%) also comes along with a decline (though modest) in systematic variation. Intensity in use of prostatectomy BPH represents the opposite situation: the overall rate has been substantially reduced (22%), while systematic variation has tripled, rising to almost 30% beyond random, signalling that the differences in exposure to prostatectomy due to place of residence may have become more accentuated.

NC breast surgery and non-oncologic hysterectomy have very slightly decreased in intensity of use while variation has also moved a bit upwards

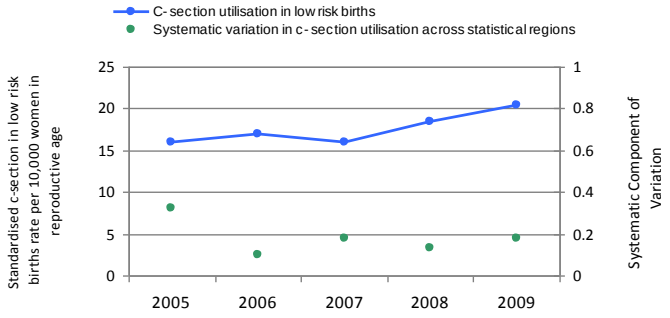
Graphs in this section provide information on two issues: the evolution of the utilisation rate (blue lines representing the standardised rate) and the evolution of the non-random variation (green dots representing the systematic component of variation), over time.

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 statistical regions more deviant from the desirable minimal utilisation.

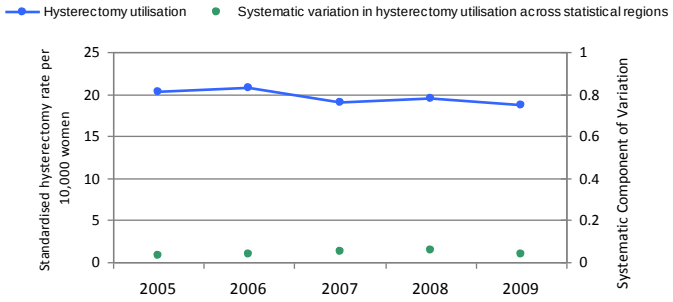
Adenotonsillectomy



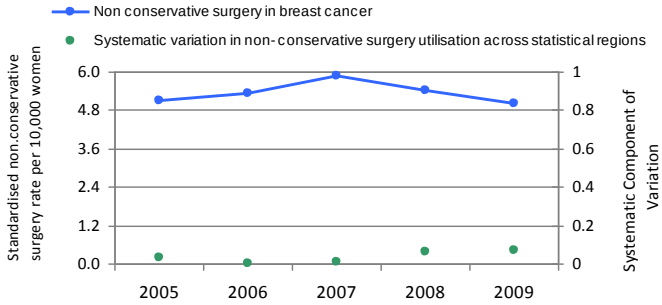
Cesarean section in low risk deliveries



Hysterectomy non-oncologic



Non conservative surgery in breast cancer



Prostatectomy in benign prostatic hyperplasia

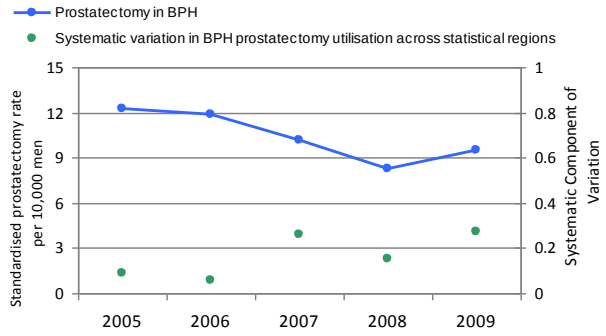


Figure 39 . Evolution of standardised rates (blue lines) and systematic variation (green dots) over time

Individual trends for Statistical Regions at both extremes of lower-value care utilisation (2005 –2009)

The insights outlined in considering overall trends in utilisation rate and systematic variation can be confirmed by looking at the individual behaviour of statistical regions over the period of analysis.

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

http://www.echo-health.eu/handbook/quintiles_lvc_slv.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 statistical regions.

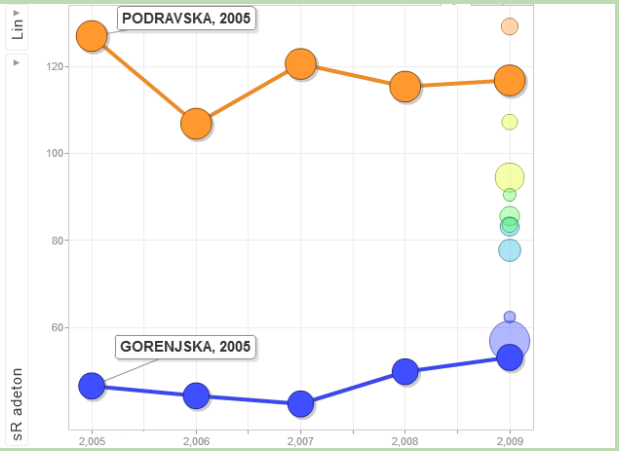


Figure 40.. Trends in adenotonsillectomy rates in all statistical regions in the period 2005-2009.

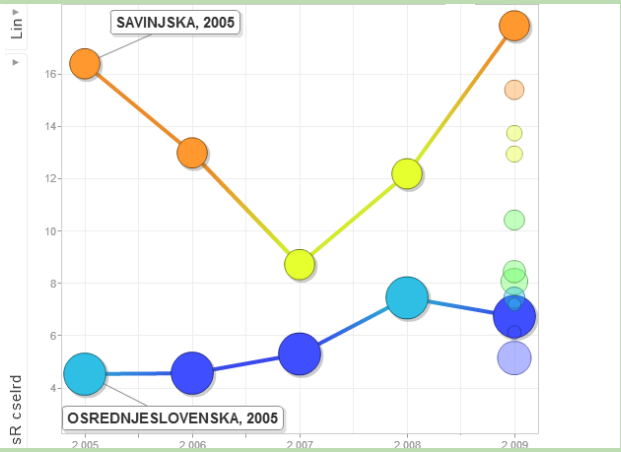


Figure 41. Trends in C-section in low risk deliveries rates in all statistical regions in the period 2005-2009.

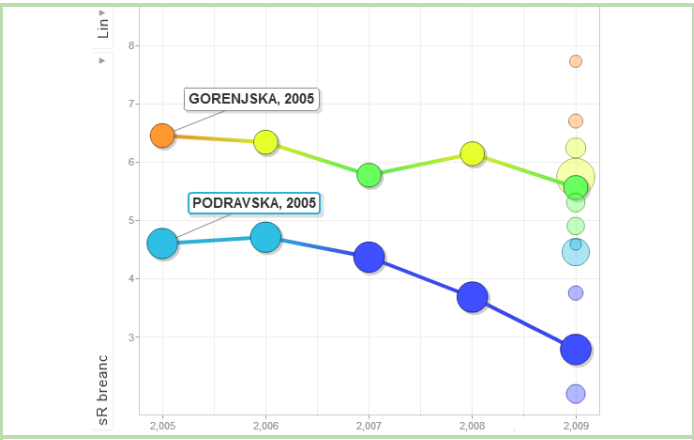


Figure 42. Trends in non-conservative cancer breast surgery rates in all statistical regions in the period 2005-2009.

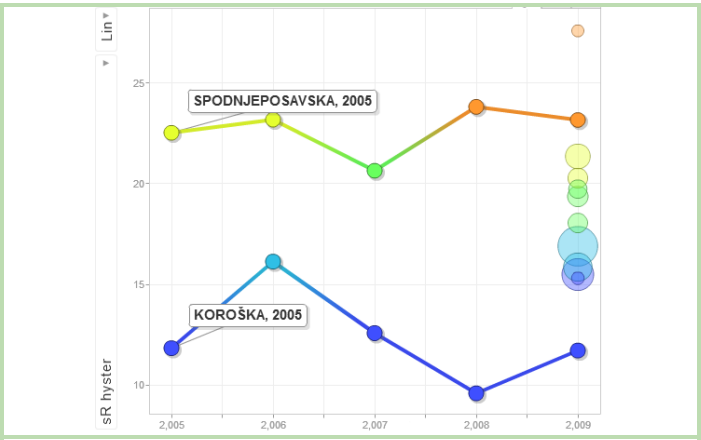


Figure 43. Trends in hysterectomy non-oncologic rates in all statistical regions in the period 2005-2009.

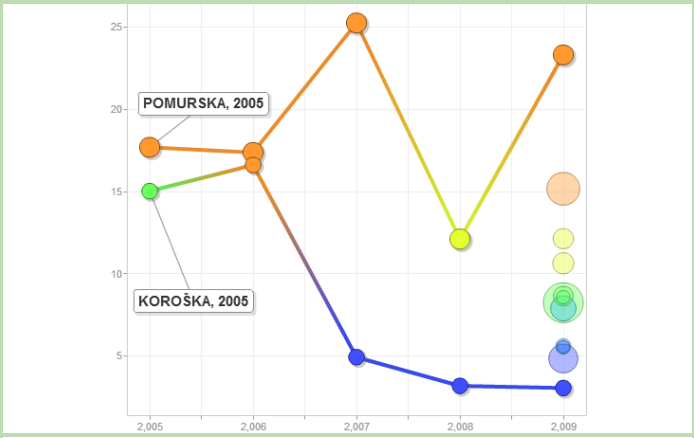


Figure 42. Trends in Prostatectomy in benign prostate hyperplasia rates in all statistical regions in the period 2005-2009.

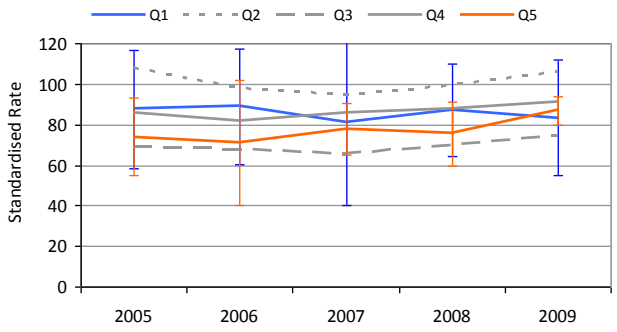
** All figures chart Standardised utilisation rates per 10,000 and time in years. Bubbles represent individual Statistical Regions, the size being proportional to population. Colours reflect a ranking of utilisation: Q5 corresponds to the highest quintile of utilisation, Q1 the lowest. Bubbles change 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 y-axis. The array of bubbles represented on 2009 reflects only those Statistical Regions which in 2002 where in the same utilisation quintile as the two tracked in the figure.* Q1 Q2 Q3 Q4 Q5

V. SOCIAL GRADIENT

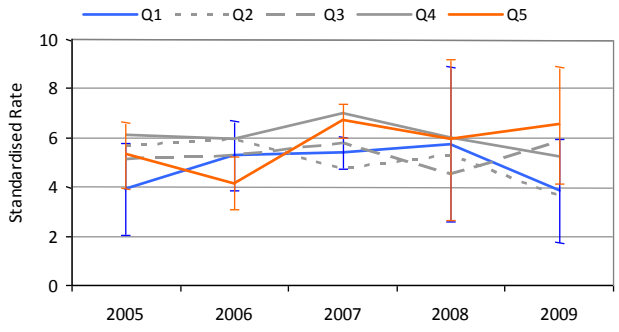
No significant differences in population exposure to lower-value care were amenable to the socioeconomic level of their statistical region of residence

The distribution of lower-value care utilisation seems to be quite homogeneous across different quintiles of statistical region wealth. It should be noted that due to the minimal differences in average income across statistical regions, this analysis has not proven as useful in the Slovenian case as for the other ECHO countries, where the social gradient could be traced using this socioeconomic indicator at geographical level.

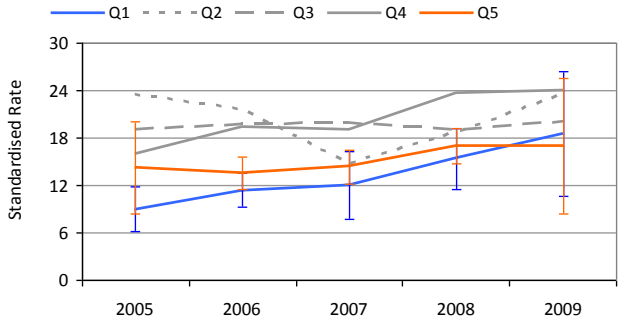
Adenotonsillectomy



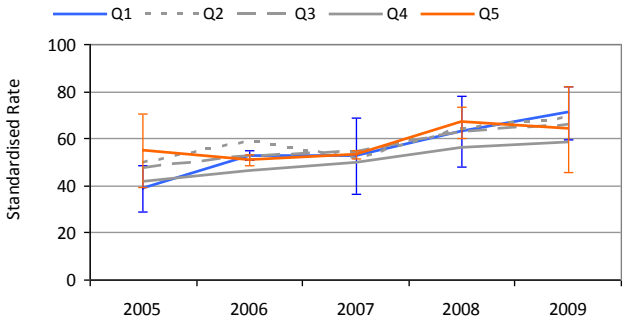
Non-conservative breast cancer surgery



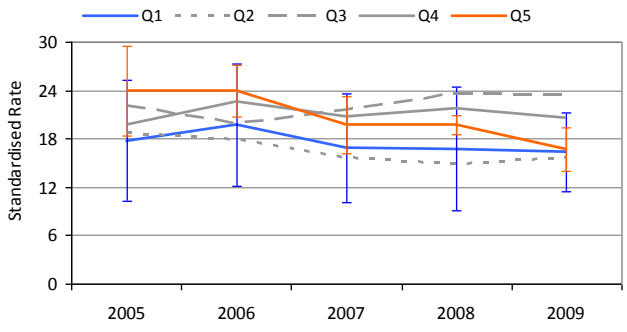
c-section low risk deliveries



Total c-section



Hysterectomy non oncologic conditions



Prostatectomy in benign prostatic hyperplasia

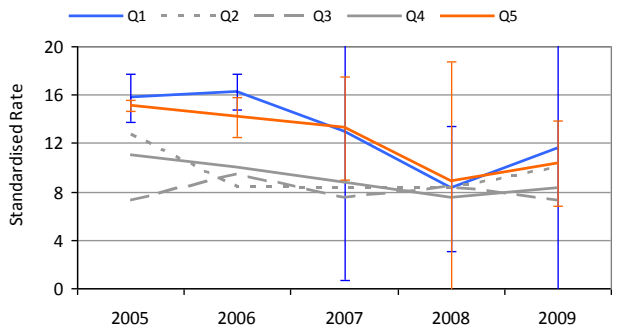


Figure 45 Over time evolution of LVC utilisation rates per quintiles of Statistical Regions average income

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 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 1,945 excess-interventions in a year for the conservative scenario and 2,187 in the drastic one. The estimation is summarised in the following table:

	Estimated excess-interventions	
	Conservative p25	Drastic p10
Adeno and/or tonsillectomy	802	813
C-section in LRD	415	478
Hysterectomy non-oncologic	267	417
NC breast cancer surgery	212	225
Prostatectomy BPH	249	254
Total	1,945	2,187

Policy-wise the key will lay in understanding the situation in those statistical regions 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 Portugal 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.

The analysis conducted, suggests that there is some room for enhancing value for money in the Slovenian system. Although Slovenia shows low rates compared with the other ECHO countries, C-section in low risk births and Adeno/tonsillectomy high rates and increasing trend deserve special consideration. 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 statistical region level, as well as social, organisational and budgetary local contexts, will serve as basis for recommendations to guide relevant decision makers in tackling this

APPENDIX 1:

Tables 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

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

APPENDIX 1:

Tables Slovenia 2009

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

	Adenoton sillectomy	C-section Low Risk Delivery	Hysterectomy Non-oncologic condition	Non-conservative Surgery breast cancer	Prostatectomy benign prostatic hyperplasia
Cases	2,354	1,106	1,568	490	458
Population	284,054	561,430	890,337	1,028,417	495,098
Crude Rate	88.29	21.25	18.74	4.99	8.89
Stand. Rate	88.87	21.45	18.51	4.91	8.88
sR Min.	53.59	10.96	11.58	2.04	2.84
sR Max.	124.25	38.79	27.63	7.68	21.88
sR. P5	53.59	10.96	11.58	2.04	2.84
sR. P25	72.86	14.42	15.45	4.04	5.22
sR. P50	88.82	17.43	18.37	5.04	7.88
sR. P75	105.59	29.95	20.72	5.93	10.78
sR. P95	124.25	38.79	27.63	7.68	21.88
EQ5-95	2.32	3.54	2.39	3.77	7.71
EQ25-75	1.45	2.08	1.34	1.47	2.06
CSV	0.08	0.2	0.05	0.07	0.28
ICC	0.00	0.00	0.00	0.00	0.00

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

APPENDIX 1:

Tables Slovenia 2009

Table 3. Excess-cases (Observed-Expected) of lower-value care in Slovenia, year 2009, conservative scenario (benchmark the 25 percent of Statistical Regions 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	802	415	267	212	249
EC25 min	6	3	1	1	1
EC25 max	272	186	54	76	79
Q1	63	30	20	8	3
Q2	102	46	65	37	31
Q3	211	96	84	63	84
Q4	426	243	98	104	131

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

Table 4. Excess-cases (Observed-Expected) of lower-value care in Slovenia, year 2009, drastic scenario (benchmark the 10 percent of Statistical Regions 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	813	478	417	225	254
EC10 min	2	2	5	3	1
EC10 max	274	195	82	79	80
Q1	34	25	62	12	5
Q2	136	90	93	39	31
Q3	213	107	110	66	86
Q4	430	256	152	108	132

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

APPENDIX 1:

Tables Slovenia Evolution over time 2005-2009

Table 5

	Adenotonsillectomy				
	2005	2006	2007	2008	2009
Cases	2370	2272	2113	2351	2354
Stand. Rate	83.76	80.94	79.75	83	86.72
sR Q1.	87.59	88.92	81.36	86.91	83.24
sR Q5.	73.90	71.10	77.77	75.52	86.84
SCV	0.1	0.09	0.15	0.08	0.07

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

Table6

	C-section Low Risk Delivery				
	2005	2006	2007	2008	2009
Cases	882	937	823	1002	1106
Stand. Rate	15.95	16.89	15.98	18.48	20.41
sR Q1.	4.38	5.56	5.85	7.50	9.05
sR Q5.	6.94	6.61	7.01	8.27	8.28
SCV	0.32	0.1	0.18	0.13	0.18

** 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 7

	Hysterectomy Non-oncologic condition				
	2005	2006	2007	2008	2009
Cases	1694	1719	1578	1629	1568
Stand. Rate	20.33	20.65	18.98	19.44	18.73
sR Q1.	17.77	19.78	16.88	16.72	16.29
sR Q5.	23.90	23.93	19.70	19.73	16.68
SCV	0.03	0.04	0.05	0.06	0.04

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

APPENDIX 1:

Tables Slovenia Evolution over time 2005-2009

Table 8

	Non-conservativeSurgery breast cancer				
	2005	2006	2007	2008	2009
Cases	550	582	569	562	490
Stand. Rate	5.1	5.31	5.85	5.43	4.99
sR Q1.	3.92	5.27	5.38	5.73	3.84
sR Q5.	5.31	4.13	6.70	5.91	6.52
SCV	0.03	0	0.01	0.06	0.07

*

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 9

	Prostatectomy benign prostatic hyperplasia				
	2005	2006	2007	2008	2009
Cases	610	551	457	415	458
Stand. Rate	12.21	11.87	10.17	8.27	9.47
sR Q1.	15.74	16.27	12.92	8.24	11.54
sR Q5.	15.10	14.16	13.25	8.91	10.35
SCV	0.09	0.06	0.26	0.15	0.27

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

APPENDIX 2:

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 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 ecologic study, each admission was allocated to the place of residence of the patient, which in turn is referred to a meaningful geographic unit – the 12 Statistical regions and the 2 Regions composing Slovenia.

The operational definitions for each indicator are detailed in the coding table in appendix 3. 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 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 by the Ministre of Health (Ministrstavo za Zdravje). Cross- and in-country sections were built upon 2009 discharges, whereas time-trends and social gradient analyses used 2005to 2009 data.

Social gradient data and data for statistical regions on average family annual income (both based in transfers and available) were obtained from the National Statistics office (Statistični Urad Republike Slovenije).

APPENDIX 3:

Definitions of indicators

	Diagnosis codes ICD10 and Procedures codes Nomesco					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Non-conservative surgery in breast cancer Women	C50 D05 Z85.3				30356-00, 30356-01, 30356-02, 30356-03, 30338-00, 30338-01, 30338-02, 30338-03, 30353-00, 30353-01, 30353-02, 30353-03, 30359-04, 30359-05, 30359-06, 30359-07, 30359-00, 30359-01, 30359-02, 30359-03	
Prostatectomy in prostate cancer Male population aged 40 or older	C61 D07.5 D09.9 D40.0				36839-01, 36839-03, 37203-00, 37203-01, 37203-02, 37203-03, 37203-04, 37203-05, 37203-06, 37207-00, 37207-01, 37200-03, 37200-04, 37200-05, 37209-00, 37210-00, 37211-00, 90407-00, 90394-00, 90395-00	

	Diagnosis codes ICD10 and Procedures codes Nomesco					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Prostatectomy in benign prostatic hyperplasia Male population aged 40 or older	N40 D29.1				37200-03, 37200-04, 37200-05, 37209-00, 37210-00, 37211-00	
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 Nomesco					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Cesarean section rate Women Aged between 15 and 55 years old					16520-00, 16520-01, 16520-02, 16520-03, 35677-00, 35677-04, 35677-05, 35678-00, 35678-01	35649-00
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	16520-00, 16520-01, 16520-02, 16520-03, 35677-00, 35677-04, 35677-05, 35678-00, 35678-01	90465-00, 90465-01, 90465-02, 90465-04, 90465-05, 90466-00, 90466-01, 90466-02, 90467-00, 90468-00, 90468-01, 90468-02, 90468-03, 90468-04, 90468-05, 90469-00, 90469-01, 90470-00, 90470-01, 90470-02, 90470-03, 90470-04, 90471-00, 90471-01, 90471-02, 90471-03, 90471-04, 90471-05, 90471-06, 90472-00, 90473-00, 90474-00, 90474-00, 90475-00, 90476-00, 90477-00, 35649-00

	Diagnosis codes ICD10 and Procedures codes Nomesco					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Hysterectomy in uterus cancer (CB) Women	C53 C54 C55 D06		C53 C54 C55 D06		35653-00, 35653-01, 35653-02, 35653-03, 35657-00, 35661-00, 35664-00, 35664-01, 35667-00, 35667-01, 35670-00, 35673-00, 35673-01, 35756-00, 35756-01, 35756-02, 35750-00, 35753-00, 35753-01, 35653-03	
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	LCC00 LCC10 LCC11 LCC20 LCC96 LCC97 LCD00 LCD01 LCD04 LCD10 LCD11 LCD30 LCD31 LCD40 LCD96 LCD97 LCE LEF13 MCA33	
Adenoidectomy and/or Tonsillectomy Population Aged 14 and younger					EMB20 EMB30 EMB99 EMB00 EMB10 EMB15 EMW99	