ECHO

EUROPEAN COLLABORATION FOR HEALTHCARE OPTIMIZATION

Potentially Avoidable Hospitalisations in Spain

I. EXECUTIVE SUMMARY

The study of systematic variations in Potentially Avoidable Hospitalizations (PAH) offers a critical view on how healthcare organizations provide care to patients with chronic conditions. In particular, it signals how effectively they are managed in the ambulatory setting

- Potentially Avoidable Hospitalisations (PAH) are defined as admissions due to acute deterioration of a chronic patient that could have been avoided with effective ambulatory care. Therefore, high PAH rates can be interpreted as potential shortcomings in ambulatory management of chronic conditions.
- This report analyses the magnitude and the variation in unplanned hospitalisations from six chronic conditions highly sensitive to ambulatory care: angina, adult asthma, congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), dehydration and diabetes short-term complications, as well as an additional indicator aggregating admissions for all 6 conditions (All PAH).
- In Spain along 2009, 35,052 discharges were flagged as a Potentially Avoidable Hospitalisation (PAH), 2.1% of all hospitalisations produced in Spain that year. In other words, an admission per 131 individuals aged 18 and older. This is a relative low rate compared to other ECHO countries.
- The most prevalent PAH condition was COPD, with 1 admission per 508 individuals aged 18 or older in 2009. In turn, short-term complications of diabetes was the least frequent with 1 admission per 8,850 individuals aged 40 or older.
- Differences across the 199 healthcare areas in the country were patent. Residents in the healthcare area with the highest standardised rates experienced up to 3 times more PAH than those living in the area with the lowest rate. For specific condition, the difference ranged from a 11.4-fold in the case of asthma admissions to a 3.1-fold difference when analysing CHF.
- Otherwise, a significant proportion of that variation was systematic -not amenable to chance. The highest systematic variation across healthcare areas was detected for asthma admissions, whereas the lowest variation corresponded to CHF. This may suggest population bearing an uneven exposure to PAH conditions.
- Regions explained up to 28% of the variation across healthcare areas, implying the relevance of regional health policies, specifically in asthma and COPD admissions.
- In some regions, their residents have more risk of admission of any of the

conditions analysed, whereas in others have less risk than expected. Regional Health policies of the later could be taken as good practices of reference.

- Overall avoidable hospitalisation rates and systematic variation have remained stable from 2002 to 2009. The same occurred in asthma, COPD, CHF and diabetes admissions

- Dehydration admissions showed a high increase by 76%, from 1 admission per 2,222 to 1 admission per 1,264 inhabitants aged 65 or older. On the contrary angina admission showed a decline up to 33% in its rate, from 1 admission per 526 to 1 admission per 788 inhabitants aged 40 or older.

- In all PAH conditions variation not deemed random exhibited values from moderate to high, pointing out population's uneven exposure to all of them.

- When examining differences in PAH admissions across wealth levels, no differences were detected in overall PAH rates. But specifically, asthma and COPD admissions were significant more frequent in wealthier areas than in most deprived ones. Just the opposite occurred with urgent angina admissions, resulting in most deprived areas having more admissions than the more affluent ones. Besides, these differences related to income area remained quite stable over time.

- In the context of ECHO project, the study of PAH might be considered as a proxy of how effectively and efficiently healthcare organizations in a particular area provide care for chronic patients –the combination of specialised, primary and long term care providers to whom populations are exposed. Thus, studying PAH would imply investigating whether population is exposed to effective primary care, effective continuity of care between primary and specialised levels and good coordination with long-term services (home care, day care, long term care facilities, etc.)

Relatively high rates of potentially avoidable hospitalisations (PAH) should be considered as a symptom of shortcomings in the ambulatory management of chronic patients, warranting assessment of elements such as the existing pathways, mix of providers available and coordination and continuity of care for patients with chronic conditions.

In the case of the Spanish Healthcare System, high rates of PAH might indicate failures in the chronic care pathways, particularly, in the continuity of care between primary and specialized care.

II. INTERNATIONAL COMPARISON

Different healthcare systems across Europe, with different organizational features, might obtain different outcomes in chronic care

This section offers a rough picture of potentially avoidable hospitalisations in Spain, in comparison with what happens in the other ECHO countries. Two insights to be retained: the magnitude of the phenomenon, and the variation across the healthcare areas.

Overall potentially avoidable hospitalisations (PAH)

Spain exhibits a relative low rate of potentially avoidable hospitalisations among ECHO countries–1 admission per 246 adult inhabitants in 2009. That means 76% less admissions than the country with the highest rates, Denmark, but 49% more admissions than Portugal, the country with the least avoidable hospitalisations rate (see appendix 1 table 1).

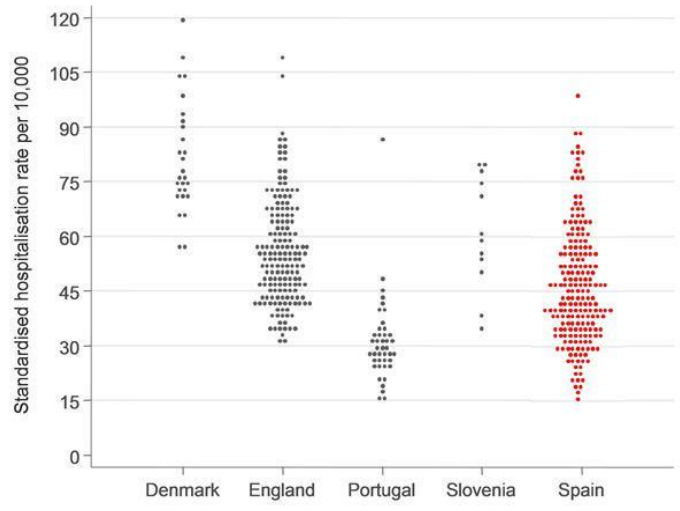


Figure 1.a. Age-sex standardised overall PAH rates per 10,000 inhabitants (natural scale to compare actual rates). Year 2009

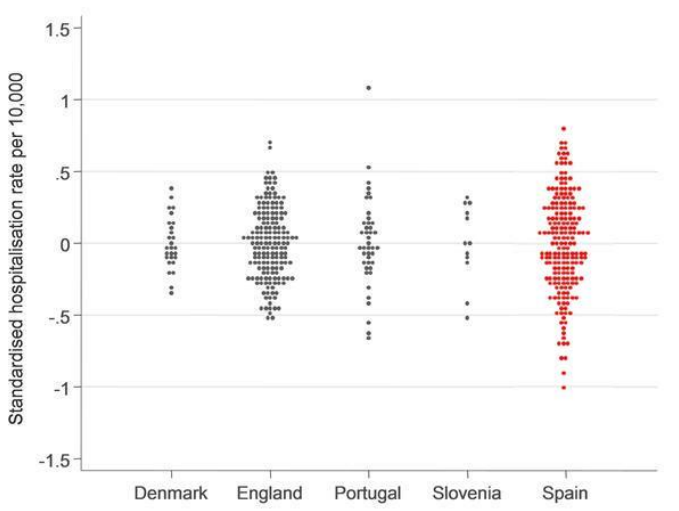


Figure 1.b. Age-sex standardised overall PAH rates per 10,000 inhabitants (normalised scale to compare degree of variation). Year 2009

** Each dot represents the relevant administrative area in the country (Healthcare Areas for Spain). The y-axis charts the standardised rate per 10,000 inhabitants (+18 age). The figure is built on the total number of interventions in 2009. The population of reference for standardization was 2002 ECHO pooled population. Looking at figure 1.a, the reader will get a sense of the magnitude of PAH in each country whereas figure 1.b provides a picture of the degree of variation across countries.*

On the contrary, Spain has the highest ratio between the highest and lowest PAH rate found at local level, that means more than 3-fold chance of undergoing PAH for residents in those healthcare areas with the highest rates. The other countries share a very similar ratio between extreme areas, ranging from 1.9 to a 2.6-fold probability of undergoing any PAH for residents in those areas with the highest rates (see appendix 1 table 1).

In general, ECHO countries have systematic variation (SCV) values moderately high ranging from 11% to 21% beyond that randomly expected; with the Danish exception, which exhibits the highest SCV value being 71% above that expected by chance (see appendix 1 table 1).

Case-mix of Potentially Avoidable Hospitalisations by country

The relative share of cases per specific condition varies across countries (figure 2), contributing to the differences in rates shown in figure 1. Nevertheless, COPD, CHF and angina seem to cause the bulk of potentially avoidable hospitalisations everywhere.

In Spain, the most frequent condition by far is COPD representing the 49% of all PAH, followed by CHF, angina, asthma, dehydration and diabetes (26%, 13%, 6%, 4% and 2% respectively).

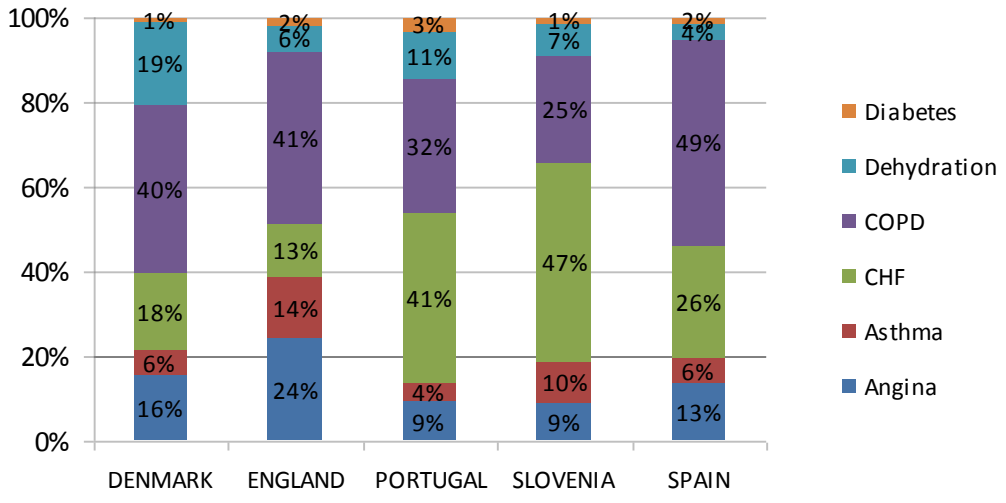


Figure 2. Share of PAH cases by country. Year 2009

** Represents the contribution of each clinical condition in the overall number of avoidable admissions by country.*

The relative share in the number of PAH cases per condition does not always translate into the relative magnitude of the specific rates (figure 3).

When comparing standardised rates across countries, Spain exhibits the lowest rate in dehydration and diabetes admissions. Respect to the other conditions analysed, Spain has average rates.

Otherwise, Denmark shows the highest rate in COPD and dehydration, being the latter far from rates detected in the other countries. England has the highest rate of asthma, angina and diabetes admissions. Conversely, it exhibits the lowest rate in CHF hospitalisations. Slovenia, with moderate PAH rates in general, shows an outstanding CHF rate. Portugal exhibits the lowest rates for urgent angina, COPD and asthma admission (see appendix 1 tables 2-7).

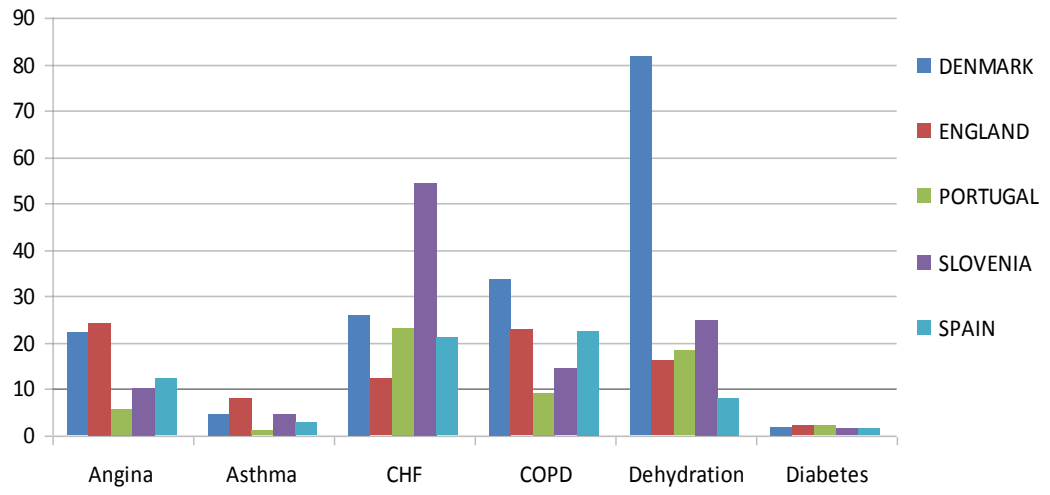


Figure 3. Magnitude of PAH per condition across countries (age-sex standardised rates per 10,000 inhabitants). Year 2009.

III. IN COUNTRY VARIATION

Potentially avoidable hospitalisations are frequent in Spain, being the most frequent in number of cases (and rate) COPD and CHF admissions.

Variation is widespread in all PAH conditions, and a relevant proportion of it is systematic –beyond that randomly expected- in all of them, with the least variation across healthcare areas in CHF and the widest in asthma admissions (see appendix 1 tables 8-9).

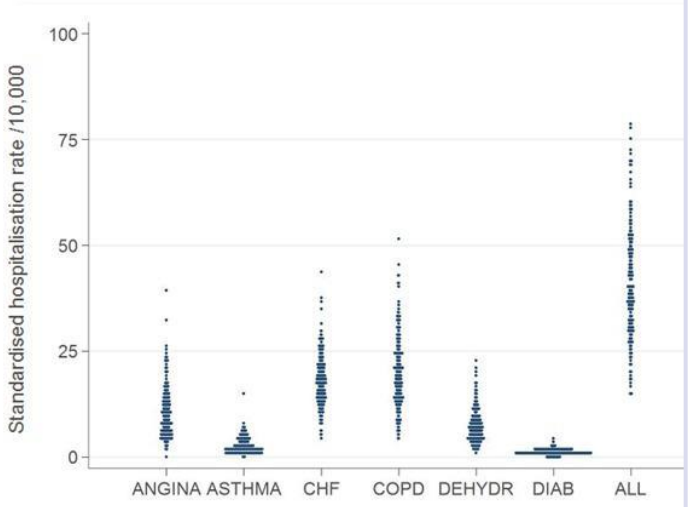


Figure 4. a. Age-sex standardised hospitalisation rates per 10,000 inhabitants (natural scale to compare actual rates). Year 2009

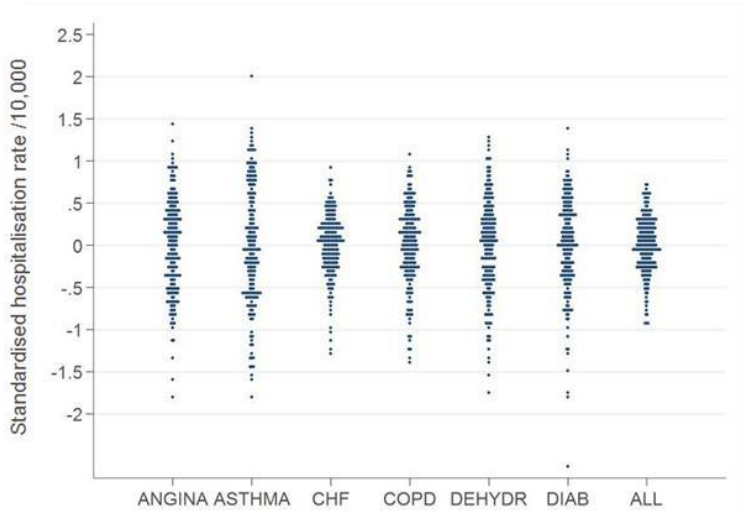


Figure 4.b. Age-sex standardised hospitalisation rates per 10,000 inhabitants (normalised scale to compare degree of variation). Year 2009

** Each dot represents the relevant administrative area in the country (Healthcare Areas for Spain). The y-axis charts the Local Authorities rate per 10,000 inhabitants. On the right, given the plausibly different prevalence of PAH conditions, standardised rates are represented in a common comparable scale. Looking at the former, reader will have sense of the magnitude of the PAH phenomenon, overall and for each condition; looking at the latter, reader will have an image of the actual variation across PAH conditions.*

Overall potentially avoidable hospitalisations (PAH)

The higher the rate or the ratio, the worse the performance.

In 2009, 155,776 admissions with one of the chronic conditions considered in this report were flagged as potentially avoidable. This figure represents around 3.2% of all the admissions in 2009 -1 admission out of 246 adult individuals.

Variation across healthcare areas with extreme low and high rates reached a 3.4-fold difference (EQ5-95), with a moderate-high systematic variation – 12% above that expected by chance. There was a moderate-high region effect representing the 28% of the PAH rate variation (see appendix 1 table 8, Intra-class Correlation Coefficient).

High rates of avoidable hospitalisations were found in the central and north-eastern part of the country and scattered healthcare areas in the north. In most of these areas residents endured at least 20% more risk of any avoidable hospitalisation than average (figures 5 and 6).

At region level, inhabitants in Asturias, Cataluña, Murcia, Cantabria and País Vasco regions had at least 20% more risk of potentially avoidable admissions than the national average (bluish areas in figure 8).

Variation in each PAH condition is represented using two geographic units: healthcare areas and regions. The first set is composed of 199 units and the second comprises 17 regions. While the healthcare area would represent local provision of chronic care, regions are used as a surrogate for regional policies affecting all the health care within each one.

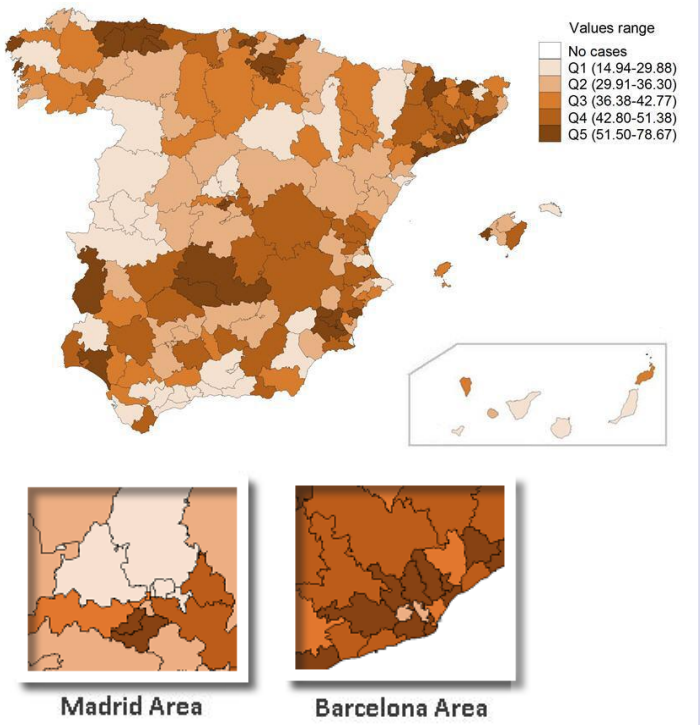


Figure 5. Age-sex standardised all PAH hospitalisation rate per 10,000 inhabitants. 199 Healthcare areas. Year 2009

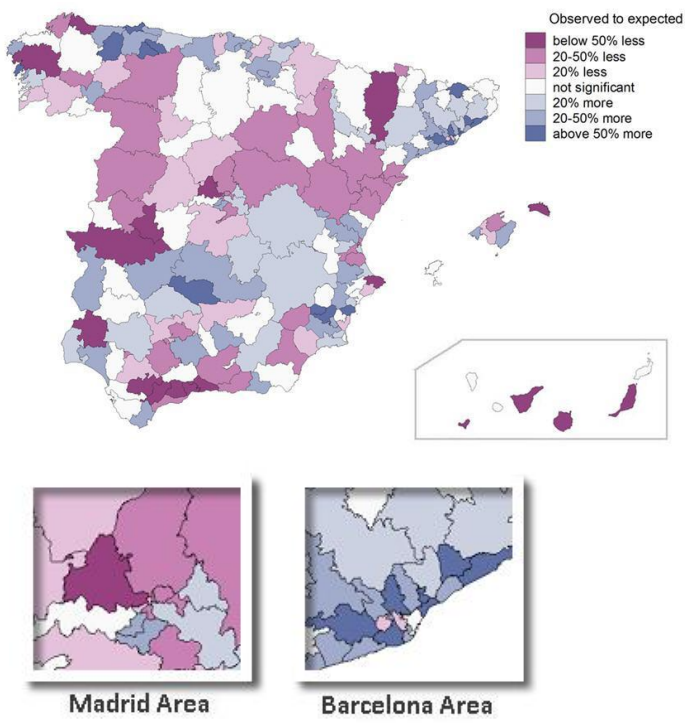


Figure 6. Ratio observed/expected all PAH admissions. 199 Healthcare areas. Year 2009

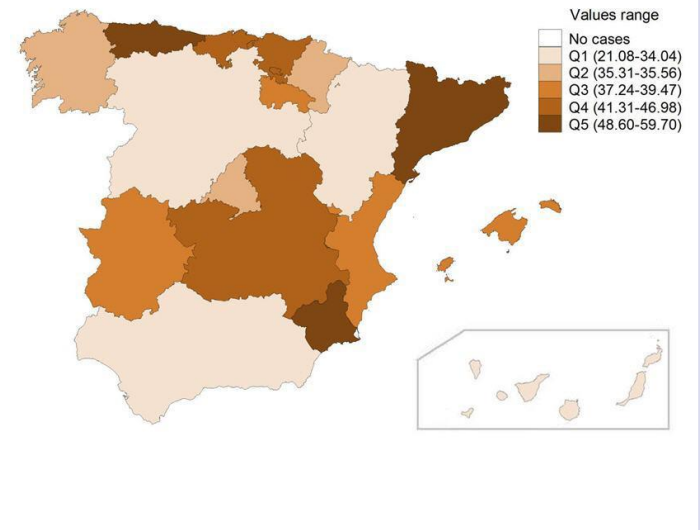


Figure 7 Age-sex standardised all PAH hospitalisation rate per 10,000 inhabitants. 17 regions. Year 2009

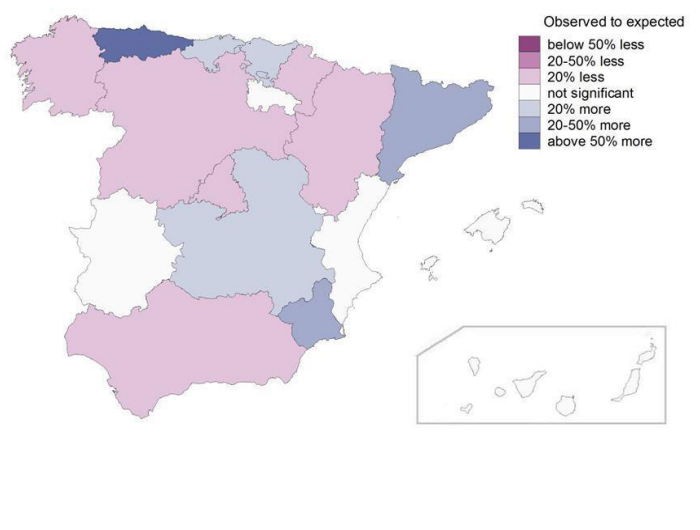


Figure 8. Ratio observed/expected all PAH admissions. 17 regions. Year 2009

** Maps on the left (standardised rates) merely represent the amount of admissions flagged as a potentially avoidable hospitalisation -the darker the colour, the more the number of admissions per 10,000 inhabitants. Areas are clustered into 5 quintiles according to their rate value (Q1 to Q5) –legend within the maps provides the range of standardised rates within each quintile. Maps on the right reflect the level of performance in each area using as a proxy the ratio observed to expected number of PAH. Population living in areas with values above 1 (bluish) will be overexposed to PAH (poor performance); population in areas with ratio below 1 (pink) will be underexposed to PAH (good performance).*

Asthma in adults

9,552 discharges with a primary diagnosis of asthma were flagged as potentially avoidable in 2009 – 1 admission per 3,984 adult inhabitants aged 18 or older.

A high 11-fold difference in hospitalisations was found between healthcare areas with extreme rates and the systematic variation found was the highest among PAH conditions, 64% above that randomly expected. Besides, the region where healthcare area belongs seems to explain up to 38% of the variation; this suggests some contextual phenomenon (e.g. regional policy) homogeneously affecting the whole regions (see appendix 1 table 8, Intra-class Correlation Coefficient).

Healthcare areas with high rates were found in the northern and eastern part of the country. 24% of all healthcare areas had 50% more risk of undergoing asthma admissions than expected (bluish areas in figure 10), whereas 30% exhibit risk below 50% (pinkish areas in figure 10). This represented an extreme behaviour when normally most of areas in other conditions or countries showed no significant risks.

Zooming out to the region level, residents in Asturias, País Vasco and Cataluña had 50% more risk of asthma admissions than national average. Besides inhabitants in Navarra, Baleares and Murcia exhibited risks at least 20% higher. On the contrary, population living in Aragon, Andalucia and Canarias had a risk below 50% of being admitted by asthma complications.

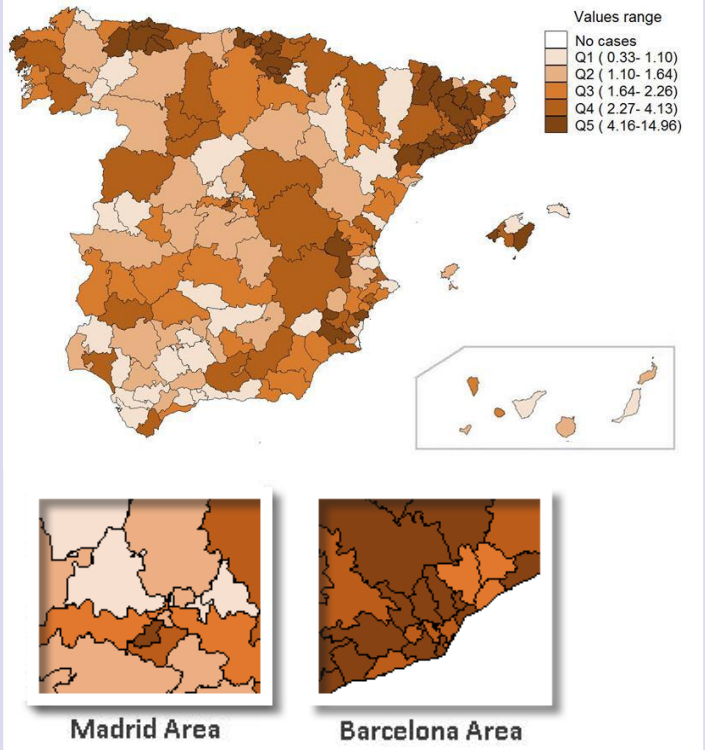


Figure 9. Age-sex standardised asthma hospitalisation rate per 10,000 inhabitants. 199 Healthcare areas. Year 2009

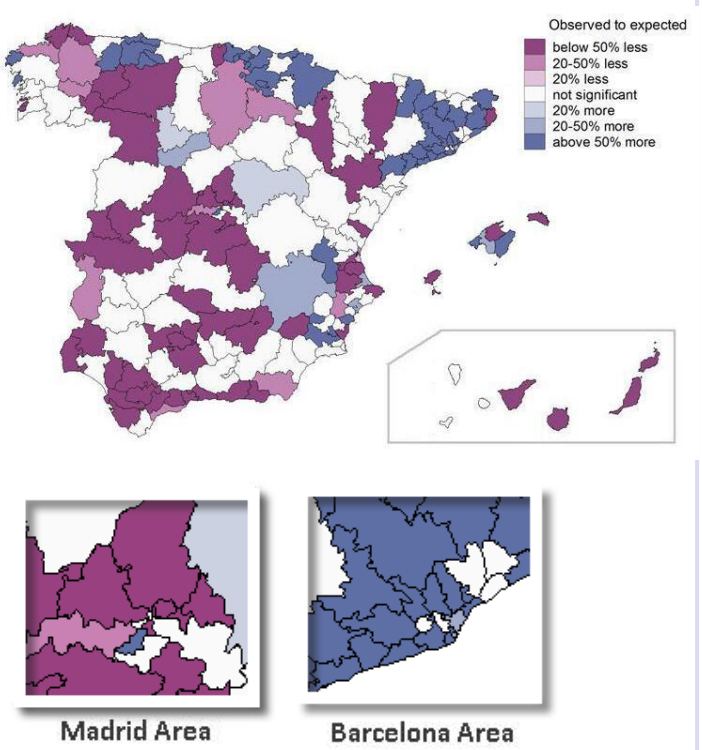


Figure 10. Ratio observed/expected asthma admissions. 199 Healthcare areas. Year 2009

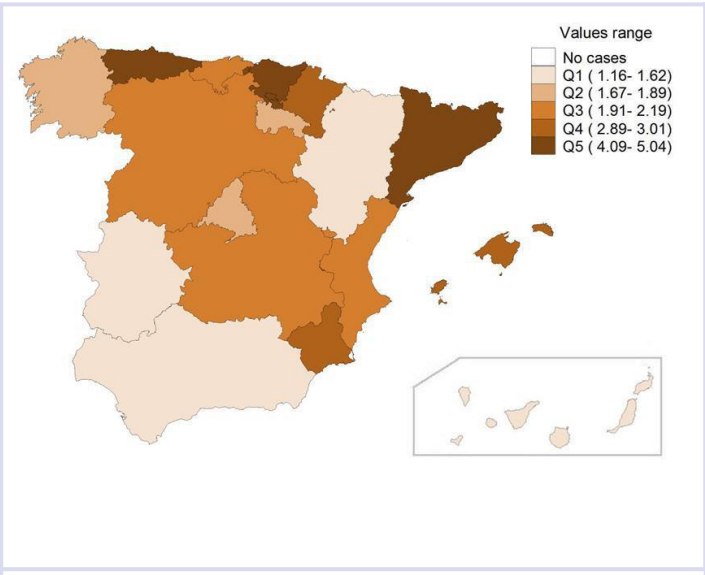


Figure 11 Age-sex standardised Asthma hospitalisation rate per 10,000 inhabitants. 17 regions. Year 2009

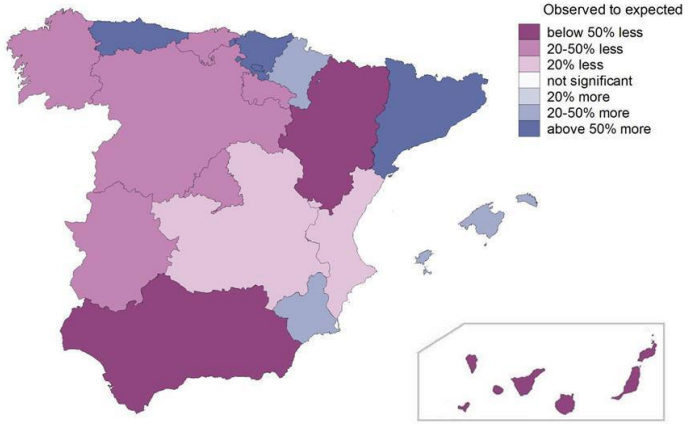


Figure 12. Ratio observed/expected asthma admissions. 17 regions. Year 2009

** Maps on the left (standardised rates) merely represent the amount of admissions flagged as a potentially avoidable hospitalisation -the darker the colour, the more the number of admissions per 10,000 inhabitants. Areas are clustered into 5 quintiles according to their rate value (Q1 to Q5) –legend within the maps provides the range of standardised rates within each quintile. Maps on the right reflect the level of performance in each area using as a proxy the ratio observed to expected number of PAH. Population living in areas with values above 1 (bluish) will be overexposed to PAH (poor performance); population in areas with ratio below 1 (pink) will be underexposed to PAH (good performance).*

Congestive Heart Failure relapse admissions (CHF)

41,056 discharges with the diagnosis of Congestive Heart Failure (CHF) were signalled as potentially avoidable in 2009 –1 admission per 556 adults aged 40 or older.

A 3-fold difference was found between areas with extreme rates (EQ5-95), and the systematic variation was just a 12% above that expected by chance, the lowest in Spanish PAH conditions. Moreover, regions barely explained 9% of the observed variation (see appendix 1 table 8, Intra-class Correlation Coefficient).

Healthcare areas with high CHF admission rates were found along the northern and eastern coast and in the south-western part of the country. Risk of admission in most of these areas remained significant higher than expected (bluish areas in figure 14).

The observed pattern was correlated with the region of residence, resulting in residents in Asturias, Cantabria, País Vasco, Murcia, Valencia and Extremadura having risk of undergoing CHF admission at least 20% higher than average (figure 16).

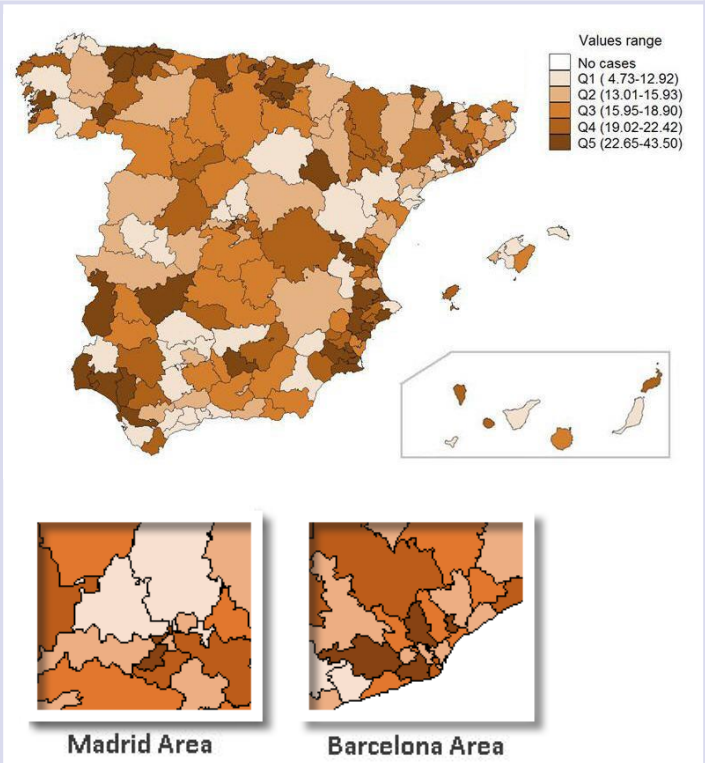


Figure 13. Age-sex standardised CHF hospitalisation rate per 10,000 inhabitants. 199 Healthcare areas. Year 2009

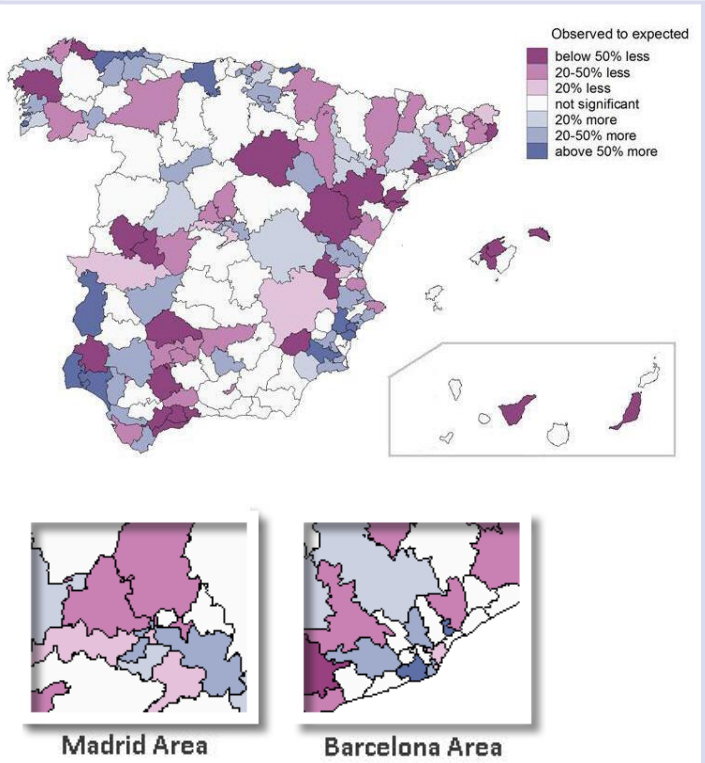


Figure 14. Ratio observed/expected CHF admissions. 199 Healthcare areas. Year 2009

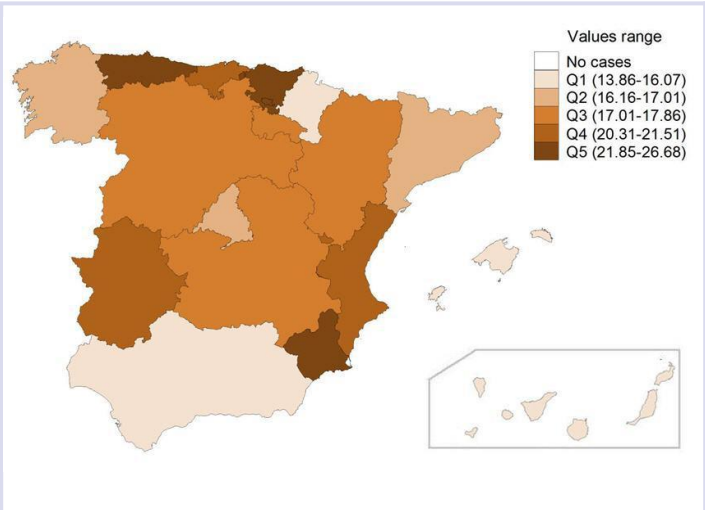


Figure 15 Age-sex standardised CHF hospitalisation rate per 10,000 inhabitants. 17 regions. Year 2009

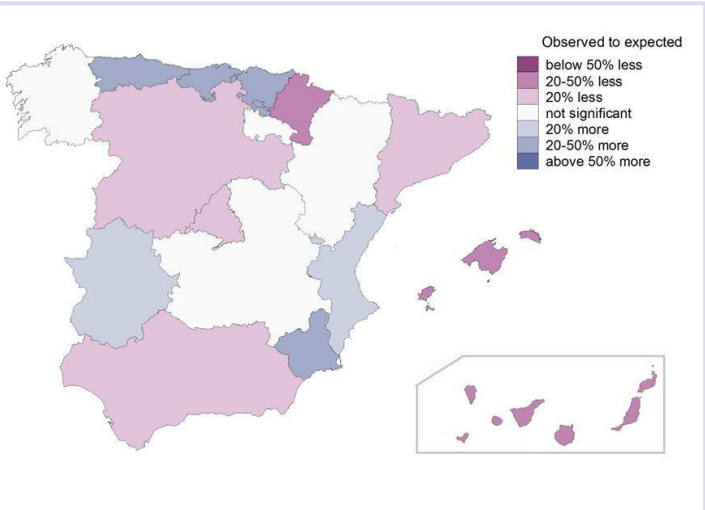


Figure 16. Ratio observed/expected CHF admissions. 17 regions. Year 2009

** Maps on the left (standardised rates) merely represent the amount of admissions flagged as a potentially avoidable hospitalisation -the darker the colour, the more the number of admissions per 10,000 inhabitants. Areas are clustered into 5 quintiles according to their rate value (Q1 to Q5) –legend within the maps provides the range of standardised rates within each quintile. Maps on the right reflect the level of performance in each area using as a proxy the ratio observed to expected number of PAH. Population living in areas with values above 1 (bluish) will be overexposed to PAH (poor performance); population in areas with ratio below 1 (pink) will be underexposed to PAH (good performance).*

Chronic Obstructive Pulmonary Disease relapse admissions (COPD)

By far, COPD is the most prevalent HPA condition. In 2009, 76,362 COPD admissions were flagged as potentially avoidable – 49% of all the admissions considered as such.

The difference between areas with extreme rates reached a 4.5-fold factor, and the systematic variation was 21% above that randomly expected.

Higher COPD admissions rates, correlating with significant higher risk of admissions for residents in those healthcare areas (at least 20% more risk than expected), could be found in the northern and central part of the country (figures 17 and 18).

In this case, up to 32% of the variation in COPD admissions could be attributed to the region of residence, which means that some contextual phenomenon (e.g. regional policy) might be homogeneously affecting the whole region (see appendix 1 table 8, Intra-class Correlation Coefficient).

When regions are the unit of analysis, residents in Asturias, Cantabria, Navarra, Cataluña, Castilla la Mancha and Murcia bear a risk 20% above that expected, whereas population in Castilla León, Aragón and Andalucia exhibited risk of COPD admission 50% less than expected (Figure 20).

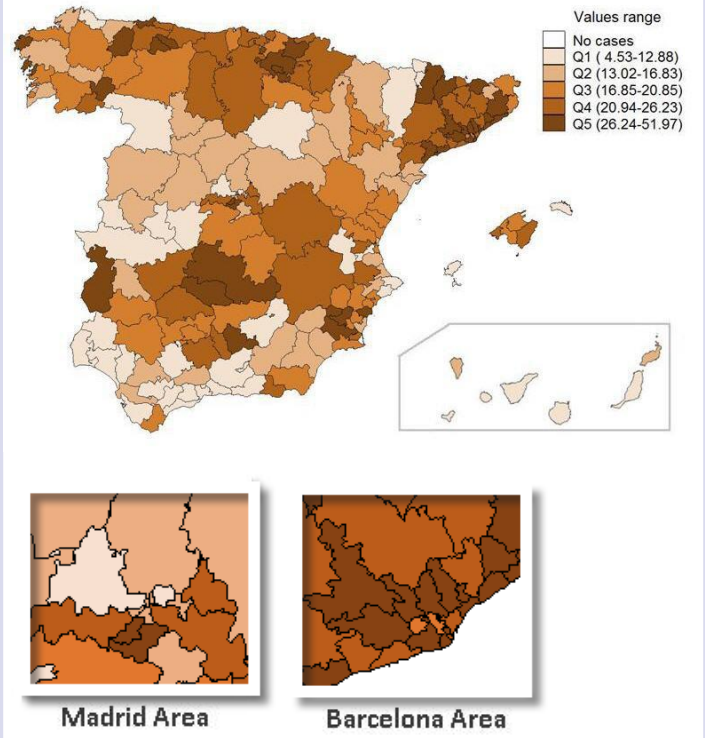


Figure 17. Age-sex standardised COPD hospitalisation rate per 10,000 inhabitants. 199 Healthcare areas. Year 2009

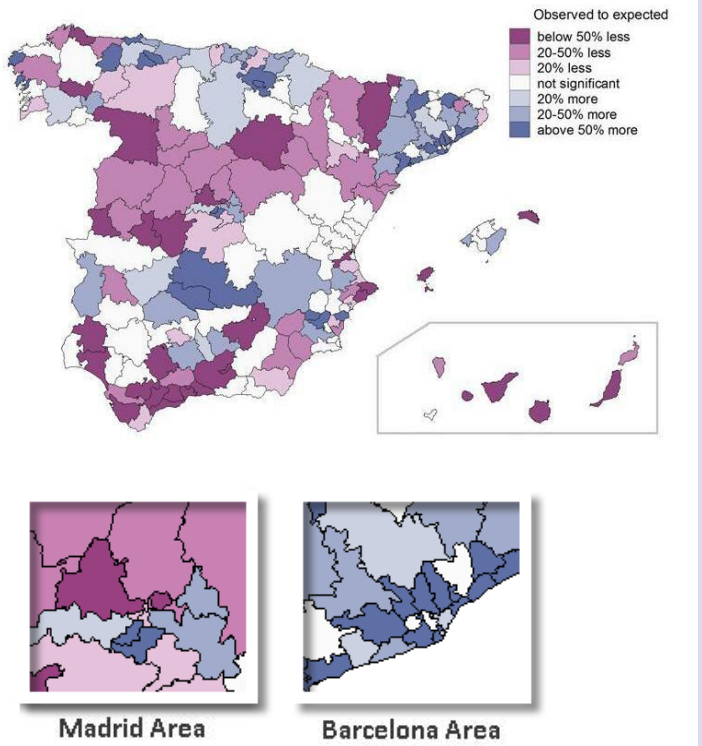


Figure 18. Ratio observed/expected COPD admissions. 199 Healthcare areas. Year 2009

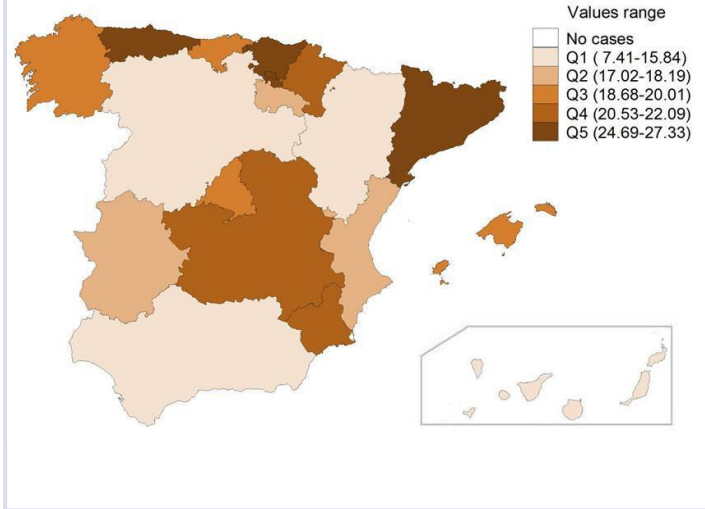


Figure 19 Age-sex standardised COPD hospitalisation rate per 10,000 inhabitants COPD. 17 regions. Year 2009

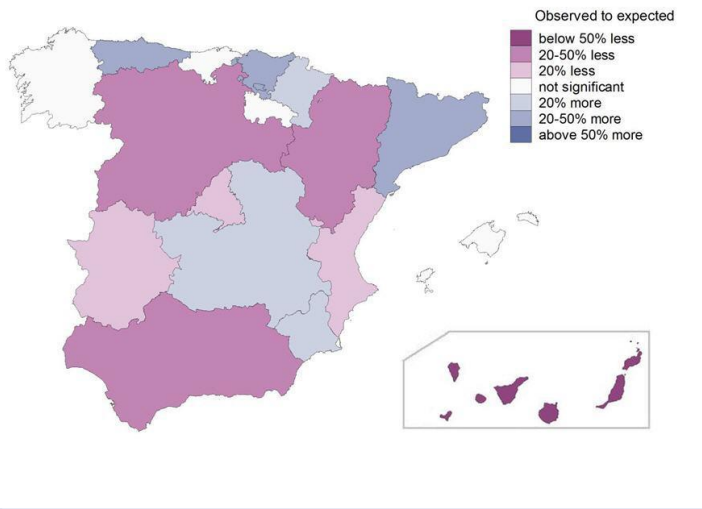


Figure 20. Ratio observed/expected COPD admissions. 17 regions. Year 2009

** Maps on the left (standardised rates) merely represent the amount of admissions flagged as a potentially avoidable hospitalisation -the darker the colour, the more the number of admissions per 10,000 inhabitants. Areas are clustered into 5 quintiles according to their rate value (Q1 to Q5) –legend within the maps provides the range of standardised rates within each quintile. Maps on the right reflect the level of performance in each area using as a proxy the ratio observed to expected number of PAH. Population living in areas with values above 1 (bluish) will be overexposed to PAH (poor performance); population in areas with ratio below 1 (pink) will be underexposed to PAH (good performance).*

Dehydration admissions

5,672 dehydration admissions were flagged as potentially avoidable in 2009 –1 admission in 1,389 inhabitants aged 65 or older.

Up to 6-fold difference was found between healthcare areas with extreme rates, with a systematic variation 24% over that expected by chance, that is twice the variation observed in CHF – the condition with the lowest systematic variation. But in this case, barely 5% of the variation in dehydration admissions could be attributed to the region of residence (see appendix 1 table 8, Intra-class Correlation Coefficient).

As observed in figure 21, high dehydration rates are observed in healthcare areas scattered throughout the whole country. Risk of a dehydration admission for the population living in 14% of the healthcare areas was 50% higher than national average (dark blue areas in figure 22).

When zooming out to the region level, residents in Cataluña, Murcia and Castilla León had at least 20% more risk of dehydration admissions than expected (figure 24).

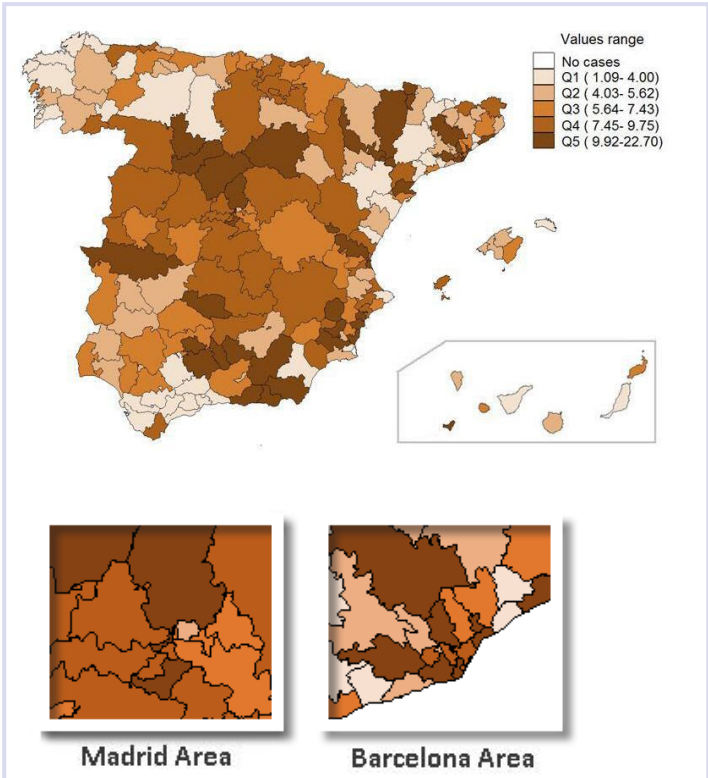


Figure 21. Age-sex standardised dehydration hospitalisation rate per 10,000 inhabitants. 199 Healthcare areas. Year 2009

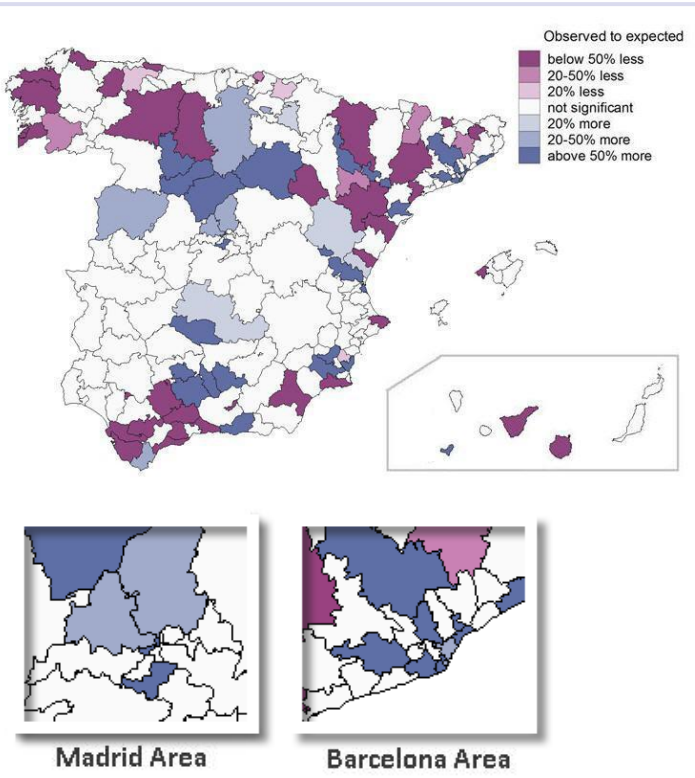


Figure 22. Ratio observed/expected dehydration admissions. 199 Healthcare areas. Year 2009

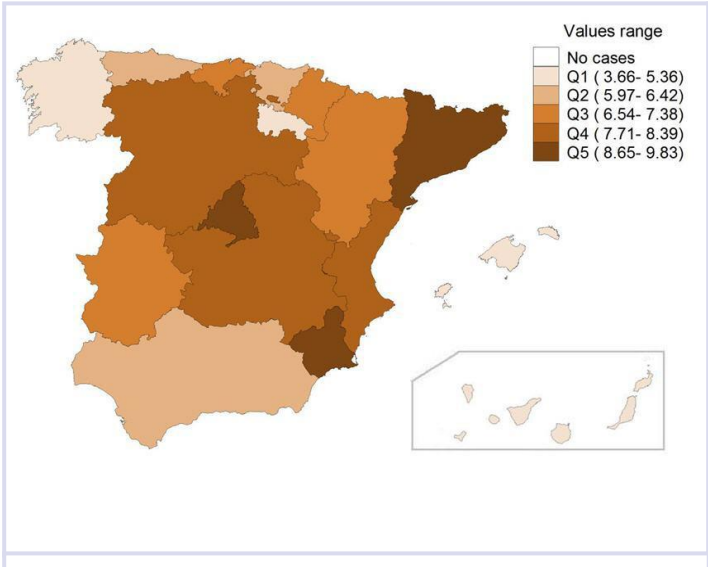


Figure 23. Age-sex standardised dehydration hospitalisation rate per 10,000 inhabitants. 17 regions. Year 2009

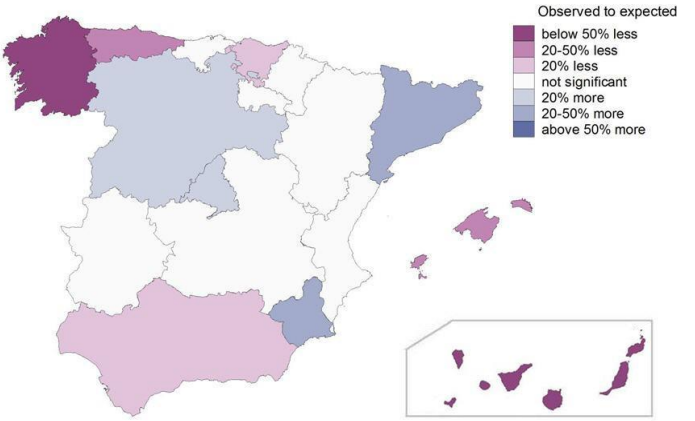


Figure 24. Ratio observed/expected dehydration admissions. 17 regions. Year 2009

** Maps on the left (standardised rates) merely represent the amount of admissions flagged as a potentially avoidable hospitalisation -the darker the colour, the more the number of admissions per 10,000 inhabitants. Areas are clustered into 5 quintiles according to their rate value (Q1 to Q5) –legend within the maps provides the range of standardised rates within each quintile. Maps on the right reflect the level of performance in each area using as a proxy the ratio observed to expected number of PAH. Population living in areas with values above 1 (bluish) will be overexposed to PAH (poor performance); population in areas with ratio below 1 (pink) will be underexposed to PAH (good performance).*

Diabetes admissions caused by a short-term complication

Diabetes short-term complications admissions were the least frequent PAH condition. In 2009, 2,420 admissions with a short-term complication of diabetes were signaled as potentially avoidable – around 1 per 8,850 adult inhabitants aged 40 or older.

Variation found between healthcare areas with extreme rates reached almost 6-fold difference and systematic variation was 19% above that expected by chance. In this case, just a weak 7% of the variation observed in diabetes admissions could be attributed to regional policies (see appendix 1 table 8, Intra-class Correlation Coefficient).

Healthcare areas with high diabetes admission rates that translated into higher risks of admissions were detected in the northern part of the country (figures 25 and 26).

At regional level, residents in Galicia, Asturias, País Vasco, Cataluña and Comunidad Valenciana bear at least 20% more risk of undergoing diabetes admissions than national average (bluish areas in figure 28).

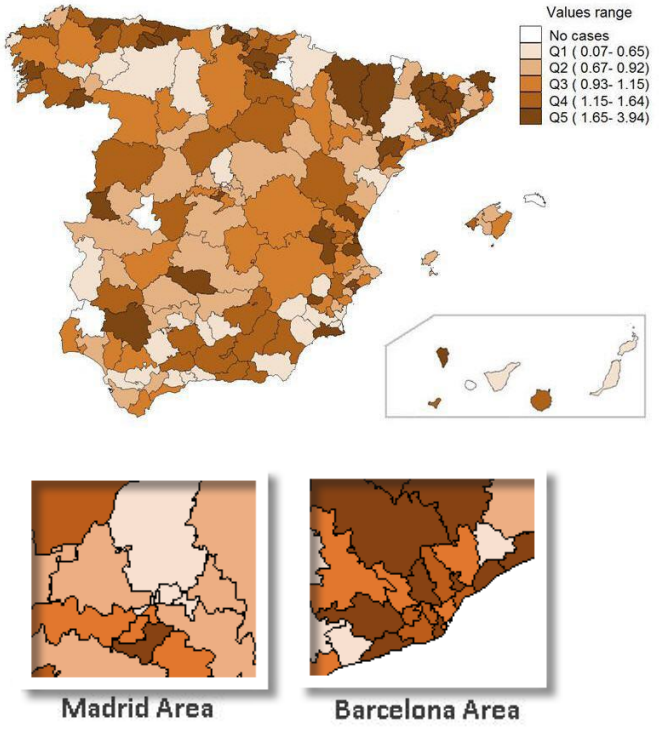


Figure 25. Age-sex standardised Diabetes hospitalisation rate per 10,000 inhabitants. 199 Healthcare areas. Year 2009

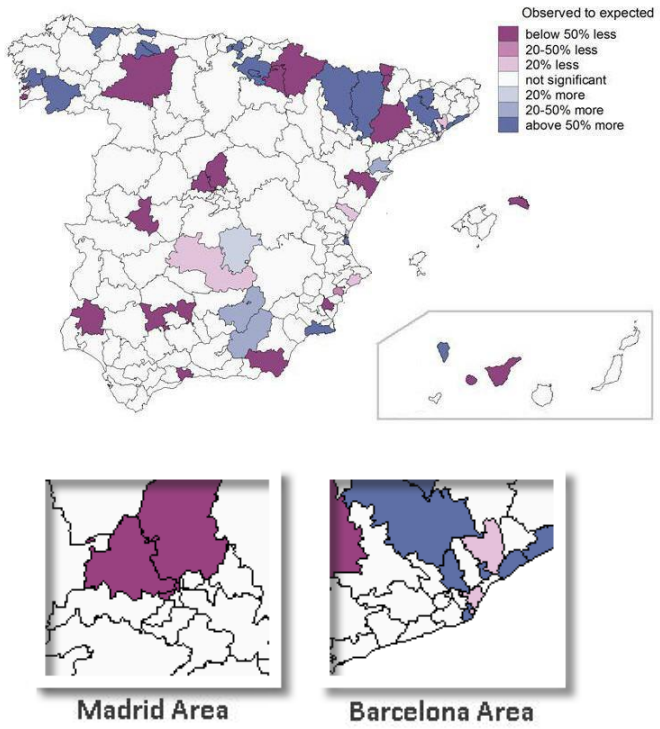


Figure 26. Ratio observed/expected diabetes admissions. 199 Healthcare areas. Year 2009

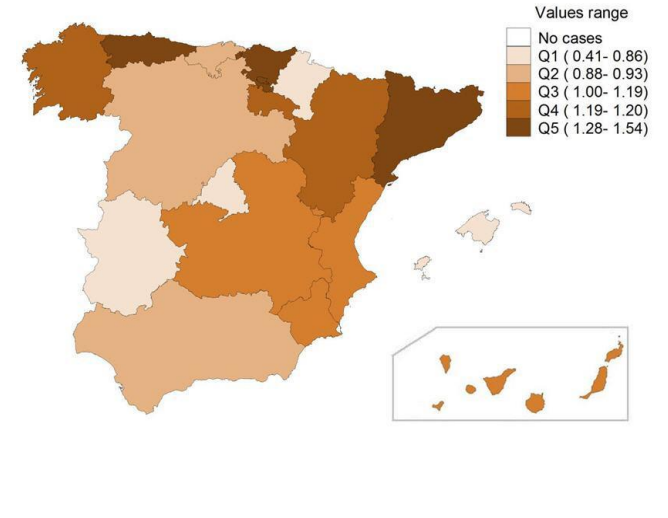


Figure 27. Age-sex standardised diabetes hospitalisation rate per 10,000 inhabitants. 17 regions. Year 2009

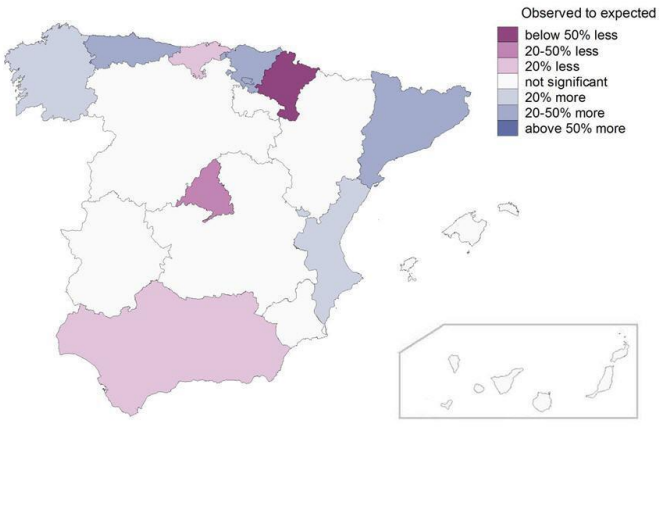


Figure 28. Ratio observed/expected diabetes admissions. 17 regions. Year 2009

** Maps on the left (standardised rates) merely represent the amount of admissions flagged as a potentially avoidable hospitalisation -the darker the colour, the more the number of admissions per 10,000 inhabitants. Areas are clustered into 5 quintiles according to their rate value (Q1 to Q5) –legend within the maps provides the range of standardised rates within each quintile. Maps on the right reflect the level of performance in each area using as a proxy the ratio observed to expected number of PAH. Population living in areas with values above 1 (bluish) will be overexposed to PAH (poor performance); population in areas with ratio below 1 (pink) will be underexposed to PAH (good performance).*

Angina admissions - with no concurrent procedure

20,856 emergency angina admissions were flagged as potentially avoidable in 2009 –1 admission per 941 inhabitants aged 40 or older.

An extreme difference of almost 6 was found between healthcare areas with extreme rates. Besides, systematic variation was one of the highest observed, being 47% above that randomly expected– as high as 4 -times the variation found in CHF, the condition with the lowest variation. Up to 25% of this observed variation was explained by the region where the healthcare area lies (see appendix 1 table 8, Intra-class Correlation Coefficient).

Figure 29 shows quite strong geographic pattern in the southern half of the country. Besides, population living in 25% of the healthcare areas exhibited risk of admission 50% above that expected (dark blue areas in figure 30).

At regional level, residents in Asturias, Murcia and Balearic islands endured 50% more risk of undergoing an urgent angina admission. In Extremadura, Castilla la Mancha, Andalucia and Comunidad Valenciana population bears risks at least 20% higher than expected (figure 32).

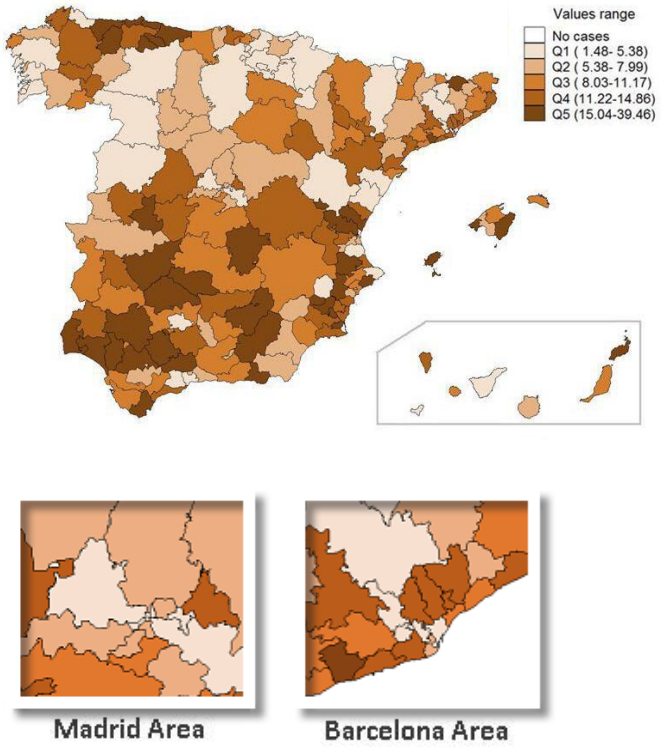


Figure 29. Age-sex standardised angina hospitalisation rate per 10,000 inhabitants. 199 Healthcare areas. Year 2009

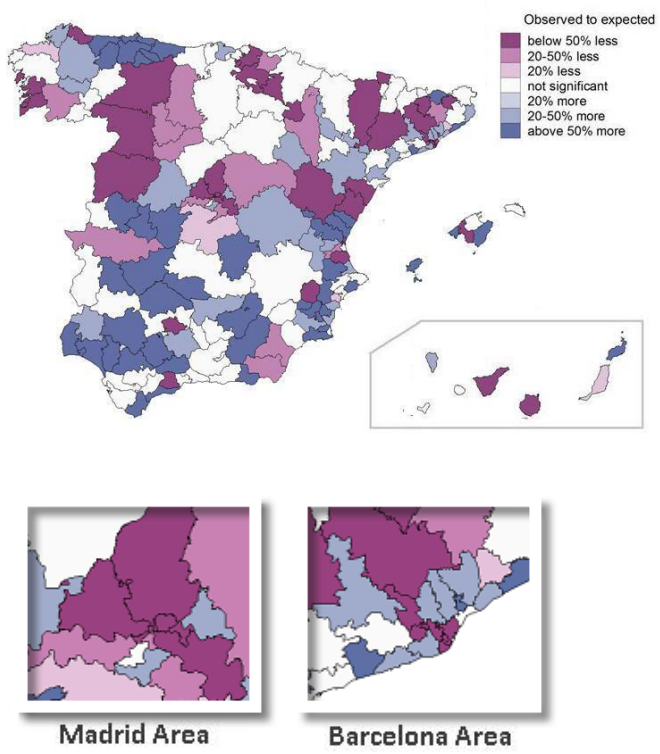


Figure 30. Ratio Observed/expected angina admissions. 199 Healthcare areas. Year 2009

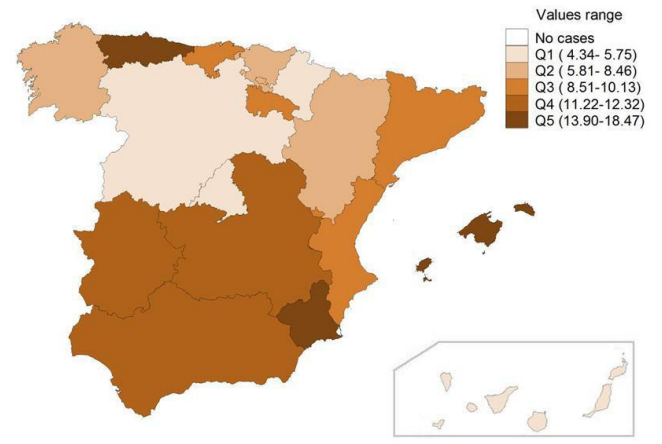


Figure 31. Age-sex standardised angina hospitalisation rate per 10,000 inhabitants. 17 regions. Year 2009

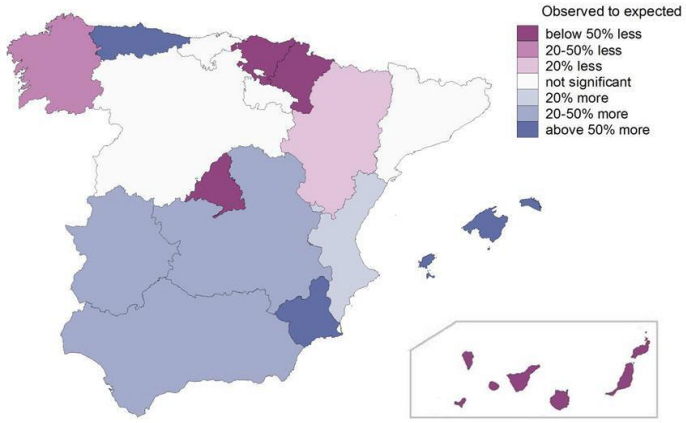


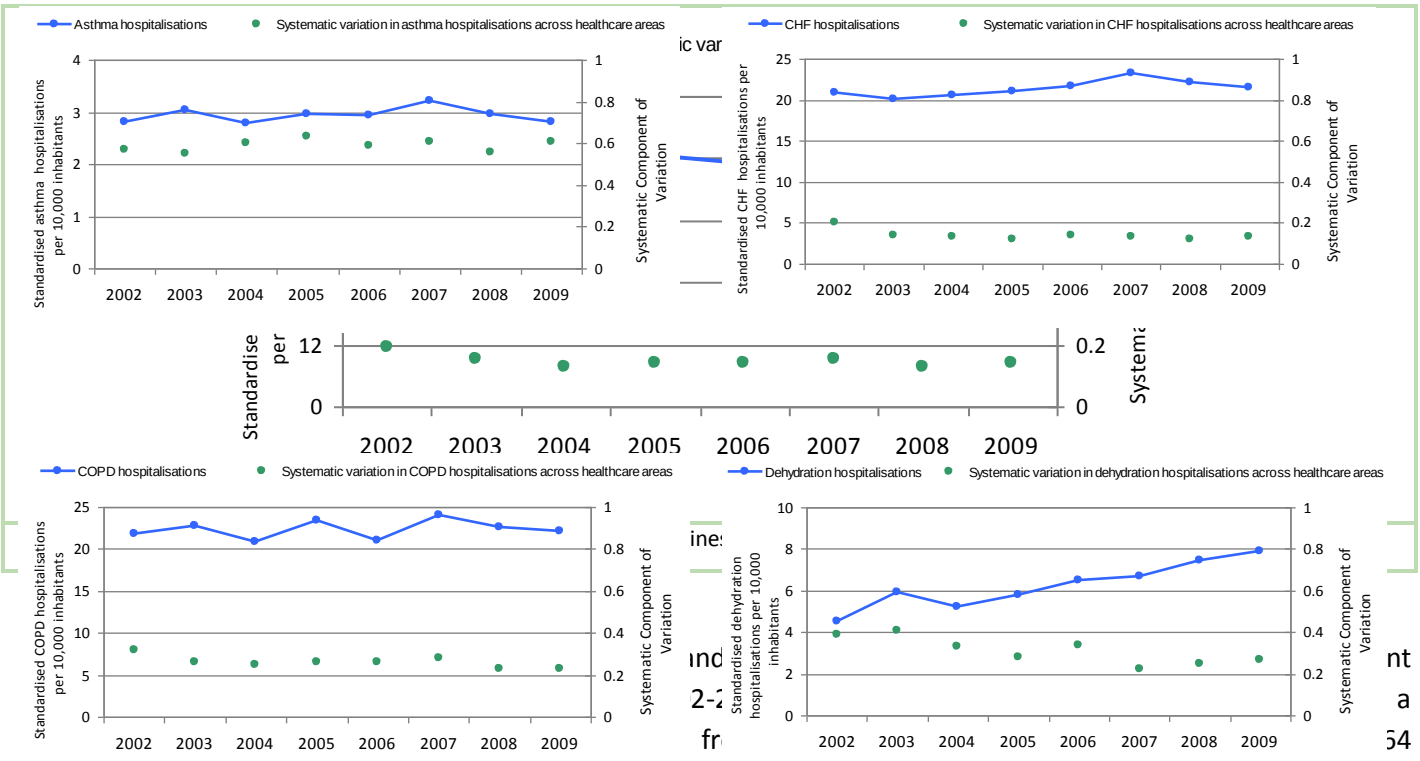
Figure 32. . Ratio Observed/expected angina admissions. 17 regions. Year 2009

** Maps on the left (standardised rates) merely represent the amount of admissions flagged as a potentially avoidable hospitalisation -the darker the colour, the more the number of admissions per 10,000 inhabitants. Areas are clustered into 5 quintiles according to their rate value (Q1 to Q5) –legend within the maps provides the range of standardised rates within each quintile. Maps on the right reflect the level of performance in each area using as a proxy the ratio observed to expected number of PAH. Population living in areas with values above 1 (bluish) will be overexposed to PAH (poor performance); population in areas with ratio below 1 (pink) will be underexposed to PAH (good performance).*

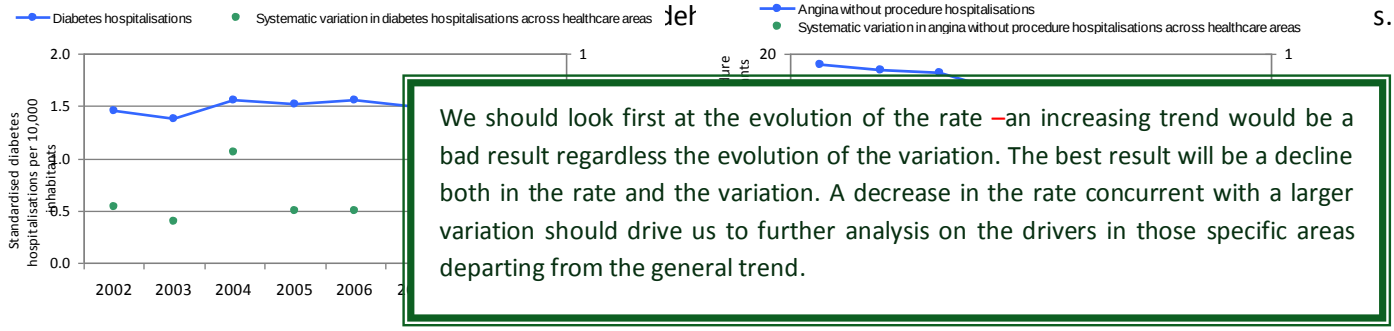
Overall avoidable hospitalisation rates and systematic variation have remained stable from 2002 to 2009.

IV. EVOLUTION OVER TIME

From 2002 to 2009, rates of potentially avoidable hospitalisations have remained very stable. There was a little 4% decrease – from 1 admission per 209 to 1 admission per 218 adult inhabitants. Systematic variation not deemed random also stayed moderate and constant over this period (see appendix 1 table 10).



inhabitants aged 65 or older, while angina admission exhibited a decline up to 33% in its rate, from 1 admission per 526 to 1 admission per 788 inhabitants aged 40 or older. Systematic variation in both cases was high although showing a



We should look first at the evolution of the rate –an increasing trend would be a bad result regardless the evolution of the variation. The best result will be a decline both in the rate and the variation. A decrease in the rate concurrent with a larger variation should drive us to further analysis on the drivers in those specific areas departing from the general trend.

In the other conditions variation not deemed random exhibited values from moderate to high, pointing out that population's uneven exposure to all of these conditions persisted over the years (see appendix 1 tables 11-16).

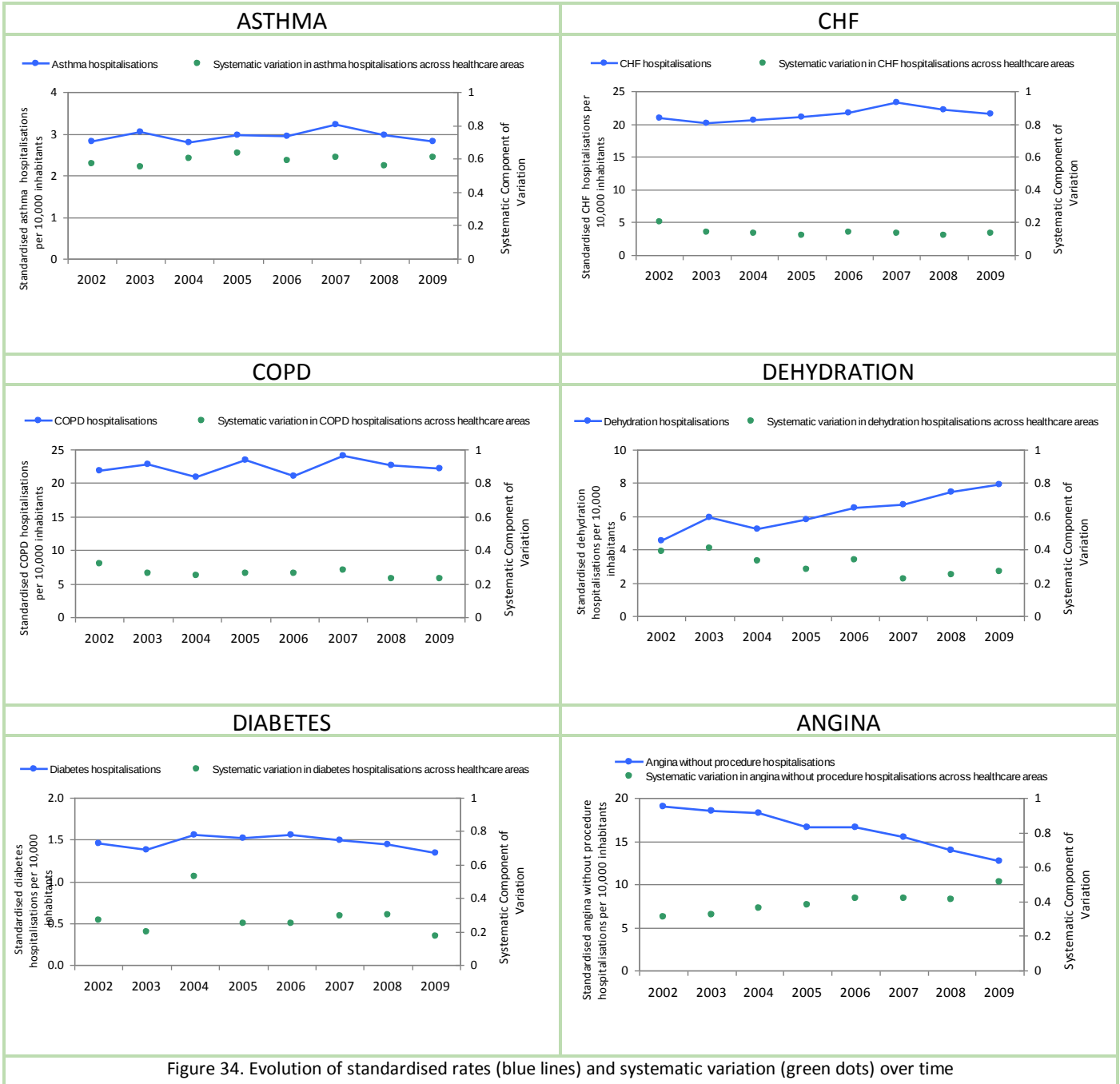


Figure 34. Evolution of standardised rates (blue lines) and systematic variation (green dots) over time

Trends in those areas within the lowest and highest quintiles of admission rates in 2002

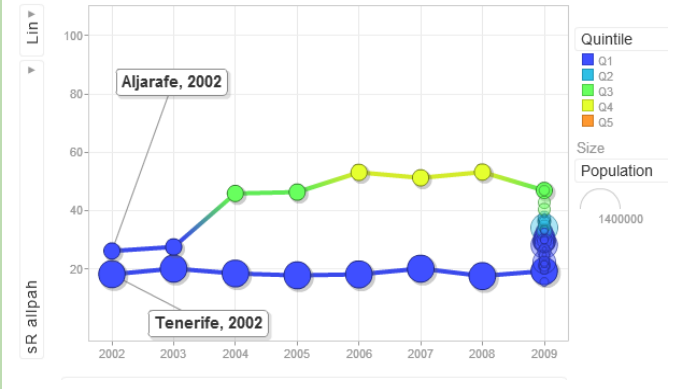


Figure 35. Trends in all PAH rates in areas with lowest levels (Q1) in 2002

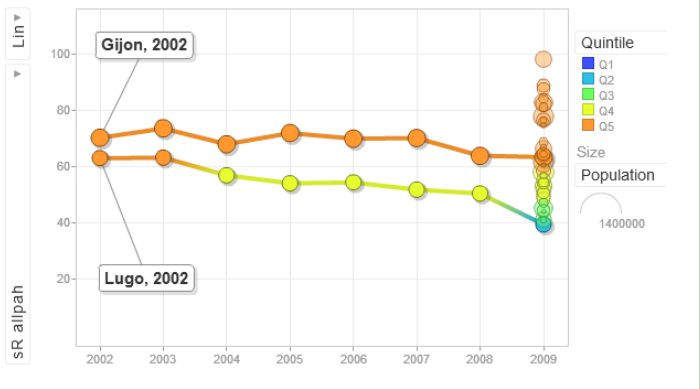


Figure 36. Trends in all PAH rates in areas with highest levels (Q5) in 2002

** Bubbles represent the healthcare areas: the bigger the bubble, the larger the population living in the area. Dark-blue corresponds to the lowest rates of PAH in the country (1st quintile -Q1), while orange represents the highest rates of PAH (5th quintile -Q5). Bubbles (the healthcare areas) will remain in the same colour or shift to another depending on where their admission rates seat each year. Colour change allows for the tracking of changes in the behaviour of individual healthcare areas over the period of analysis.*

Taking as an example Aljarafe and Tenerife, both areas showed a good performance (among the lowest levels of PAH) in 2002. The evolution of these two areas was quite uneven. While Tenerife has maintained its low rates of PAH, Aljarafe has experienced a steady increase reaching the third utilisation quintile by the end of the period (figure 35).

It can be observed that areas with highest levels of PAH in 2002 (Q5 in orange) also experienced uneven evolution over the period. Thus, while Gijón remained in the same quintile over time, the PAH rate in Lugo decreased over time until the second quintile of exposure (figure 36).

In the following figures (figures 37-48), similar patterns can be observed in each of the specific chronic conditions studied in this Atlas report.

You can track the evolution of individual healthcare areas at:

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

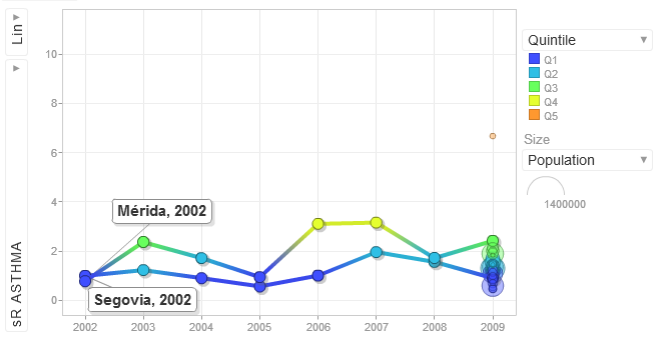


Figure 37. Trends in asthma rates in areas with lowest levels (Q1) in 2002.

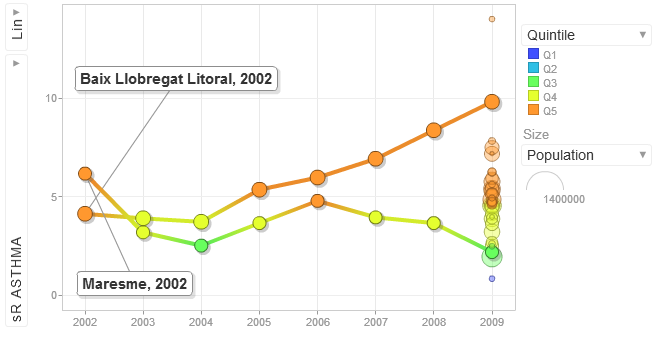


Figure 38. Trends in asthma rates in areas with highest levels (Q5) in 2002.

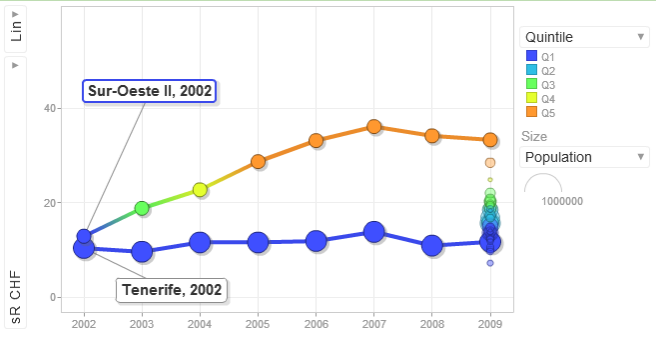


Figure 39. Trends in CHF rates in areas with lowest levels (Q1) in 2002.

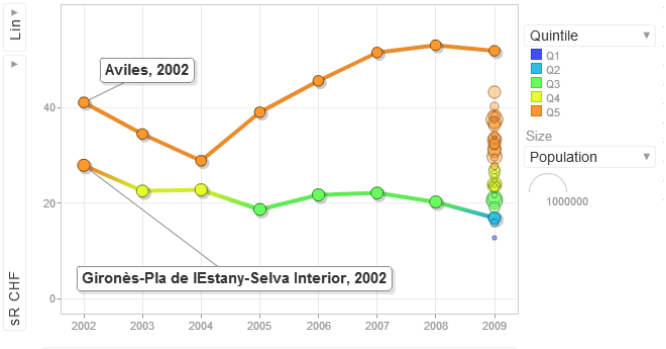


Figure 40. Trends in CHF rates in areas with highest levels (Q5) in 2002.

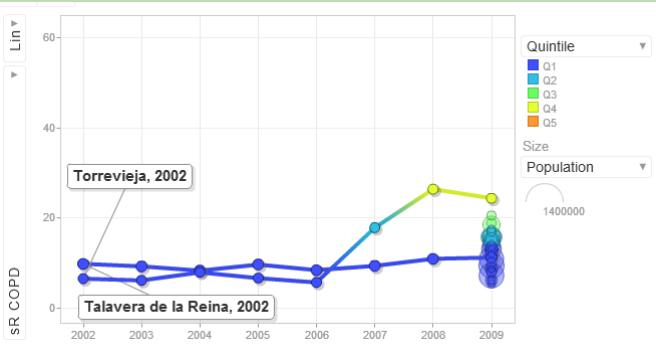


Figure 41. Trends in COPD rates in areas with lowest levels (Q1) in 2002

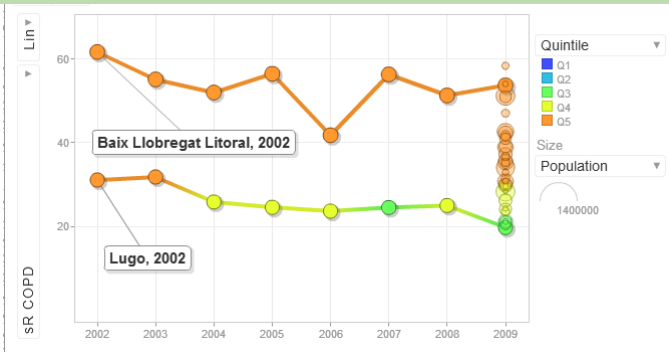


Figure 42. Trends in COPD rates in areas with highest levels (Q5) in 2002.

Bubbles represent the healthcare areas: the bigger the bubble, the larger the population living in the area. Dark-blue corresponds to the lowest rates of PAH in the country (1st quintile -Q1), while orange represents the highest rates of PAH (5th quintile -Q5). Bubbles (the healthcare areas) will remain in the same colour or shift to another depending on where their admission rates seat each year. Colour change allows for the tracking of changes in the behaviour of individual healthcare areas over the period of analysis.

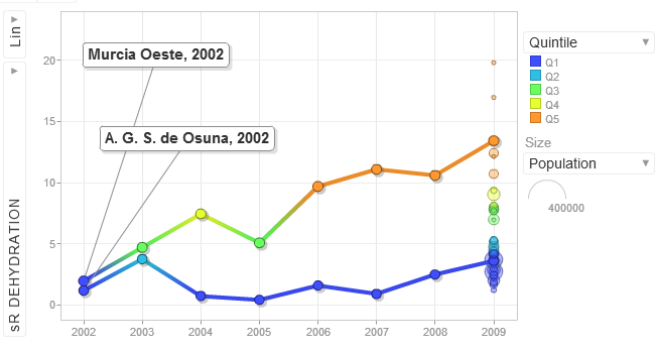


Figure 43. Trends in dehydration rates in areas with lowest levels (Q1) in 2002.

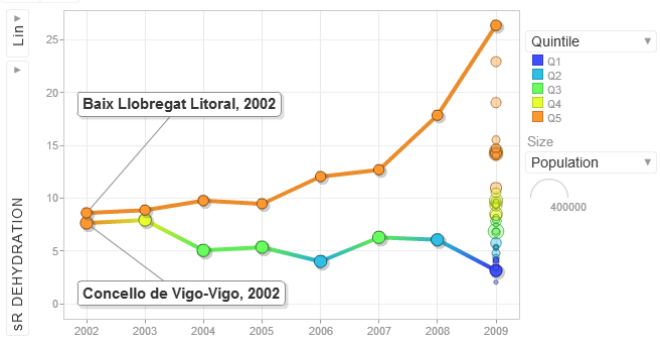


Figure 44. Trends in dehydration rates in areas with highest levels (Q5) in 2002.

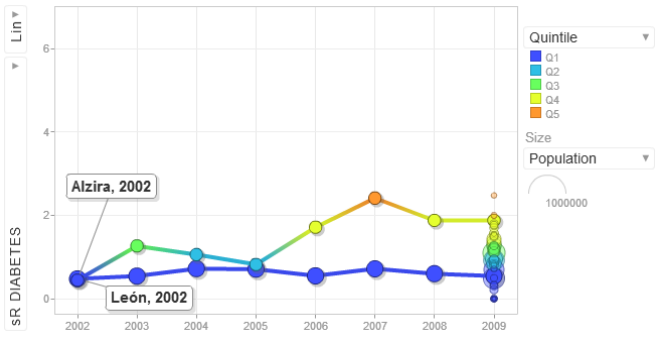


Figure 45. Trends in diabetes rates in areas with lowest levels (Q1) in 2002.

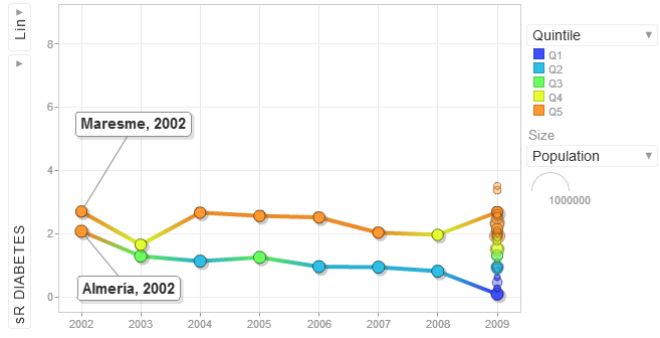


Figure 46. Trends in diabetes rates in areas with highest levels (Q5) in 2002

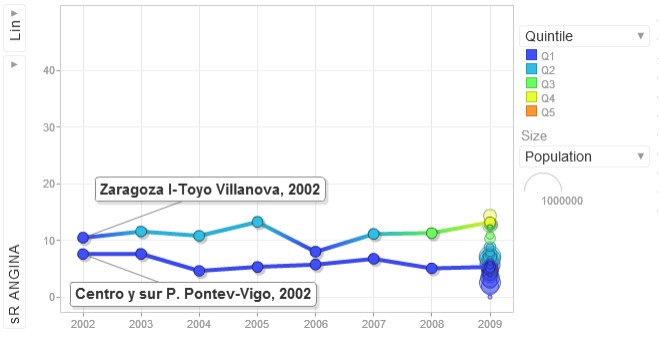


Figure 47. Trends in angina rates in areas with lowest levels (Q1) in 2002.

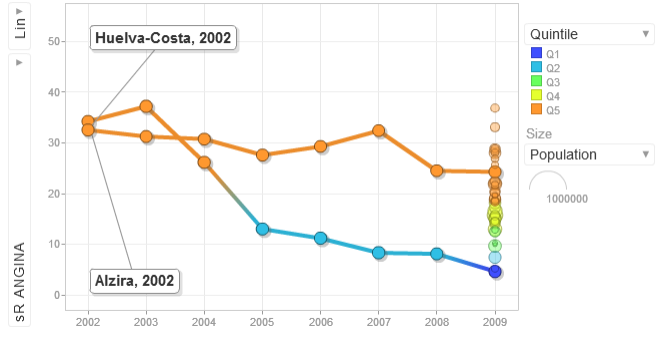


Figure 48. Trends in angina rates in areas with highest levels (Q5) in 2002

Bubbles represent the healthcare areas: the bigger the bubble, the larger the population living in the area. Dark-blue corresponds to the lowest rates of PAH in the country (1st quintile -Q1), while orange represents the highest rates of PAH (5th quintile -Q5). Bubbles (the healthcare areas) will remain in the same colour or shift to another depending on where their admission rates seat each year. Colour change allows for the tracking of changes in the behaviour of individual healthcare areas over the period of analysis.

In Spain, there are no significant differences in potentially avoidable hospitalisations across wealth levels

V. SOCIAL GRADIENT

When examining the overall rates of potentially avoidable hospitalisations, wealthier healthcare areas showed higher PAH rates than most deprived ones, though these differences were not statistically significant (figure 49).

Graphs in this section aim at providing some sense of the behaviour of potentially avoidable hospitalisations depending on the average level of affluence in the local authority. At a glance it will show whether there are differences between the better-off and the worse-off areas, and if these differences vary over time.

Overall potentially avoidable hospitalisations

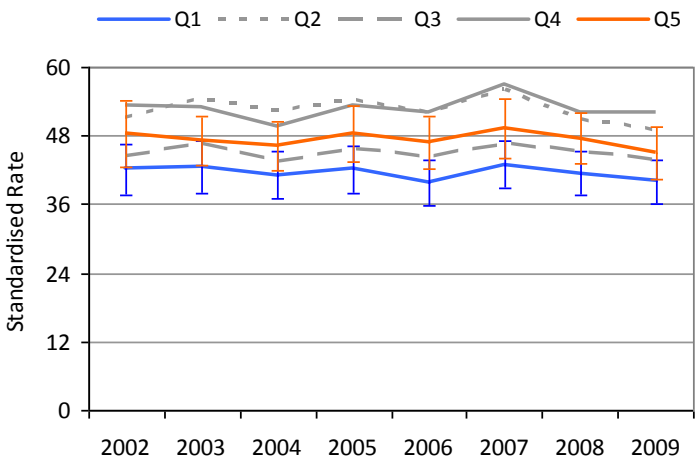
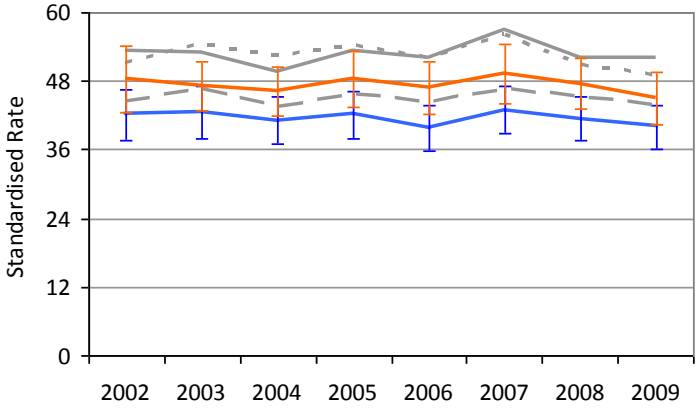


Figure 49. Trend in PAH standardised rates by average income quintile

Areas are divided in 5 categories of wealth (average annual family income available per individual): from Q1 (blue) corresponding to the worse-off areas, to Q5 (orange) corresponding to the better-off areas. Each line in the graph corresponds to the evolution of PAH rates in a wealth level (evolution in Q1 in blue and in Q5 in orange). Statistical differences across income quintiles will occur just when the confidence intervals (whiskers) for different quintiles do not overlap.



…economic levels, again, …etes admissions. On the …antly more frequent in opposite occurred with in most deprived areas …t ones (figure 50). These

differences related to income area remained quite stable over time as indicated by the constant gap between extreme quintiles in asthma, COPD and angina

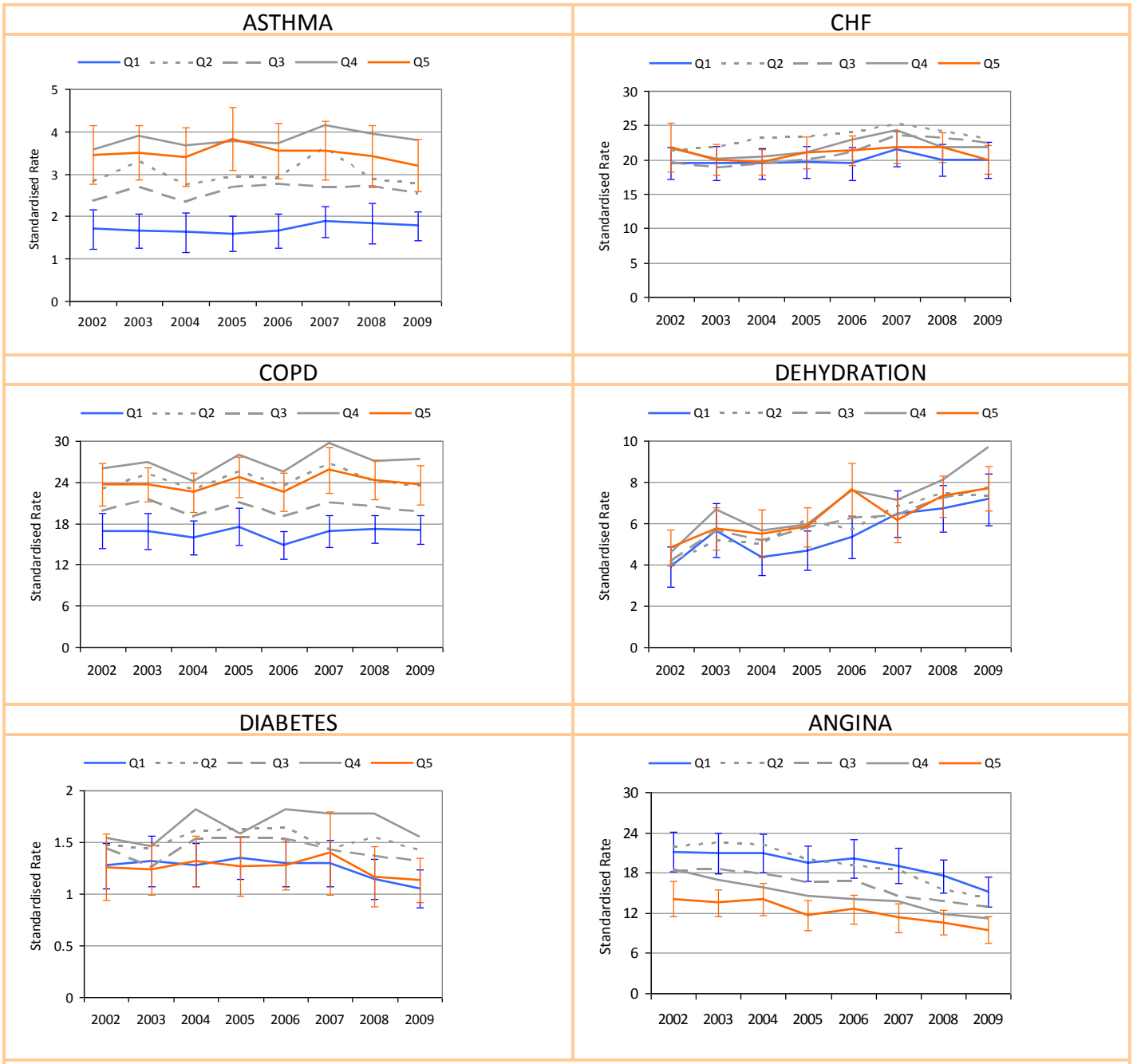


Figure 50. Trend in PAH standardised rates by income quintile and clinical condition

Areas are divided in 5 categories of wealth (average annual family income available per individual): from Q1 (blue) corresponding to the worse-off areas, to Q5 (orange) corresponding to the better-off areas. Each line in the graph corresponds to the evolution of PAH rates in a wealth level (evolution in Q1 in blue and in Q5 in orange). Statistical differences across income quintiles will occur just when the confidence intervals (whiskers) for different quintiles do not overlap.

VI. POLICY IMPLICATIONS

Spain has a relative low rate of potentially avoidable hospitalisations compared to other ECHO countries. Along the period 2002-2009, PAH rates remained very stable as well as variation not amenable to random phenomena.

These PAH rates found in Spain, would warrant further investigation of the underlying causes. In the literature, different factors have been suggested to explain differences in PAH:

- Barriers in access to primary care and/or failures in the quality of the services provided by physicians and staff nurses in primary care settings
- Lack of continuity of care between primary and specialized care.
- Distance to a hospital and/or different supply of hospital care. High concentration of hospital care very often ends up in hospital utilisation (i.e. more patients derivation from ambulatory consultation in case of relapse). Besides, some countries have developed special hospital units dedicated to deal with chronic patients' relapses.
- Different discharging policies. For instance: premature discharges from acute episodes could increase the overall number of admissions on the basis of a rise in the number of readmissions.
- Socio-economic differences. Socioeconomic conditions have been described to have a major impact on prevalence and severity of chronic conditions and patient's ability to self-care and to seek healthcare or navigate available resources.
- Supply of long-term and home-care. When community and home care are insufficient, reliance on hospital care becomes more critical to assure control of chronic patients.

In Spain healthcare areas act as integrated providers to a certain extent, and primary care professionals are trained to treat chronic conditions and act as gatekeepers. Thus, rates found suggest exploring possible failures in the quality of the services provided in primary care settings and in the continuity of care between primary and specialized care.

Since the number of outpatient contacts per person is among the highest in Europe, despite its sharply decrease in last decade[1], we could hypothesize that may be there is a lack of coordination between primary and specialized care.

Interestingly high-income healthcare areas showed higher PAH admissions rates than less affluent ones, and in asthma and COPD, these differences were significant the whole period. This could be due to a more developed primary care in low income areas, care that prevent this kind of hospitalisations; or population in most deprived areas having limited access to hospital care, or a mixture of both. In the case of angina it seems that some kind of health action would be needed in lower income areas to improve management of angina.

On the other hand, Autonomous Community or region of residence explained 28% of the observed variation in overall PAH rate, and up to 37% in some conditions. Since this is a relevant level in healthcare policy-making, it will be worth taking some time in understanding possible mechanisms underlying this influence. Besides, in some Autonomous Communities, their residents have more risk of admission of any of the conditions analysed, whereas in others have less risk than expected. Thus, regional Health policies of the latter could be taken as good practices of reference.

Otherwise, the supply of long-term and home-care may also play a role in reducing the number of avoidable hospitalisations. It would be worth exploring this effect in the areas with the lowest rates. If those areas were better endowed in this type of services, their role might be confirmed and they could be taken as good practices of reference.

Potentially avoidable hospitalisations rates in Spain are relatively low compared to other ECHO countries and have remained stable over the period 2002-2009. Despite not being high, their variation across healthcare areas suggests uneven population exposure to PAH across the country.

Understanding possible mechanisms to improve management of chronic conditions promoted by each administrative tier (healthcare area or region), as well as their coordination, could be key in reducing PAH.

[1] Data from http://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_PROC

APPENDIX 1:

International Comparison 2009

Table 1

	ALL PAH				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	35,052	228,527	24,252	7,303	155,776
Stand. Rate	81.44	55,65	30.90	60.95	46.19
EQ5-95	1.87	2.34	2.64	2.25	3.22
SCV	0.71	0.15	0.21	0.15	0.11

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

Table 2

	ASTHMA				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	2,029	32,406	932	703	9,552
Stand. Rate	4.63	7.96	1.05	4.71	2.84
EQ5-95	2.89	2.18	6.97	4.01	6.18
SCV	0.13	0.77	0.69	0.07	0.37

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

Table 3

	CHF				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	6,420	29,080	9,862	3,442	41,056
Stand. Rate	25.83	12.36	23.03	54.14	20.93
EQ5-95	2.21	1.85	2.21	3.34	2.58
SCV	0.77	0.1	0.65	6.56	0.29

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

Table 4

	COPD				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	14,206	93,597	7,709	1,853	76,362
Stand. Rate	33.7	22.69	9.09	14.2	22.25
EQ5-95	1.98	2.37	4.16	2	3.53
SCV	0.58	0.22	0.39	0.13	0.27

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

APPENDIX 1:

International Comparison 2009

Table 5

	DEHYDRATION				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	6,906	12,981	2,674	548	5,672
Stand. Rate	81.65	16.11	18.19	24.7	8.13
EQ5-95	2.94	2.26	4.5	6.83	4.24
SCV	26.3	0.1	1.04	1.42	0.29

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

Table 6

	DIABETES				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	406	4667	772	100	2420
Stand. Rate	1.74	2.02	2.01	1.51	1.32
EQ5-95	3.58	2.6	12.87	11.3	4.67
SCV	0.26	0.36	2.5	0.41	0.11

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

Table 7

	ANGINA				
	DENMARK	ENGLAND	PORTUGAL	SLOVENIA	SPAIN
Cases	5,507	55,805	2,303	661	20,856
Stand. Rate	22,08	24.29	5.45	10.23	1.9
EQ5-95	4,41	2.68	4.88	9.74	4.41
SCV	0,69	0.73	0.56	0.26	0.25

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

APPENDIX 1:

Spain 2009

Table 8

	Asthma	CHF	COPD	Dehydration	Diabetes	Angina	All PAH
Cases	9552	41056	76362	5672	2420	20856	155776
Population	39,808,144	22,988,560	39,808,144	7,812,087	22,988,560	22,988,560	39,808,144
Crude Rate	2.56	18.3	20.69	7.22	1.14	10.73	42.56
Stand. Rate	2.51	17.99	19.69	7.2	1.13	10.63	40.71
sR Min.	0.33	4.73	4.53	1.09	0.07	1.48	14.94
sR Max.	14.96	43.5	51.97	22.7	3.94	39.46	78.67
sR. P5	0.54	9.07	7.71	2.38	0.41	3.83	20.31
sR. P25	1.13	13.64	13.73	4.27	0.69	6.19	31.02
sR. P50	1.88	17.64	18.52	6.6	1.01	9.72	38.72
sR. P75	3.56	21.5	24.42	9.07	1.47	13.7	48.72
sR. P95	6.19	28.28	34.65	14.85	2.14	22.67	69.22
EQ5-95	11.4	3.12	4.5	6.23	5.22	5.92	3.41
EQ25-75	3.14	1.58	1.78	2.12	2.14	2.21	1.57
ICC	0.37	0.09	0.32	0.05	0.07	0.25	0.28

sR: Age-sex Standardised Rate per 10,000 habitants (Reference population: national 2009); sR Px: percentile x of sR distribution; EQ: Extremal Quotient; ICC: Intra class Correlation Coefficient.

Table 9

	Asthma	CHF	COPD	Dehydration	Diabetes	Angina	All PAH
SUR Mín.	0.15	0.27	0.24	0.15	0.08	0.17	0.37
SUR Máx.	6.59	2.44	2.69	3.13	3.7	4.34	2.01
SUR P5	0.24	0.52	0.39	0.34	0.38	0.41	0.54
SUR P25	0.49	0.77	0.71	0.6	0.65	0.66	0.79
SUR P50	0.78	0.98	0.96	0.91	0.96	1.06	0.98
SUR P75	1.49	1.2	1.26	1.26	1.43	1.49	1.24
SUR P95	2.53	1.57	1.78	2.04	2.08	2.52	1.7
SCV	0.64	0.12	0.21	0.24	0.19	0.47	0.12

SUR: Standardised Utilization Ratio (observed/expected); SUR Px: percentile x of the SUR distribution; SCV: Systematic Component of Variation.

APPENDIX 1:

Spain 2002-2009

Table 10

	ALL PAH							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	162,864	165,854	159,402	167,242	159,394	171,689	160,895	155,776
Stand. Rate	47.8	48.68	46.5	48.65	46.95	50.34	47.36	45.85
sR Q1.	42.18	42.44	41.11	42.1	39.83	42.94	41.38	39.95
sR Q5.	48.29	47.24	46.14	48.26	46.84	49.34	47.49	45
SCV	0.19	0.15	0.13	0.14	0.14	0.15	0.13	0.14

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

Table 11

	Asthma							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	9,533	10,340	9,737	10,169	9,790	10,929	10,095	9,533
Stand. Rate	2.81	3.03	2.79	2.97	2.93	3.22	2.97	2.81
sR Q1.	1.7	1.65	1.63	1.59	1.66	1.88	1.83	1.77
sR Q5.	3.45	3.5	3.4	3.83	3.54	3.55	3.42	3.2
SCV	0.57	0.55	0.6	0.63	0.59	0.61	0.56	0.57

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

Table 12

	CHF							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	38,888	38,084	39,367	41,378	42,558	45,360	42,149	41,056
Stand. Rate	20.95	20.16	20.52	21.09	21.73	23.27	22.17	21.46
sR Q1.	19.46	19.5	19.45	19.63	19.42	21.57	19.92	19.92
sR Q5.	21.78	19.98	19.68	21.03	21.33	21.87	21.84	20.02
SCV	0.2	0.14	0.13	0.12	0.14	0.13	0.12	0.13

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

APPENDIX 1:

Spain 2002-2009

Table 13

	COPD							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	75,434	78,573	73,153	80,969	72,531	82,347	77,884	76,362
Stand. Rate	21.83	22.76	20.84	23.44	21.04	23.98	22.55	22.18
sR Q1.	16.86	16.89	15.9	17.53	14.81	16.9	17.18	17.03
sR Q5.	23.61	23.65	22.53	24.75	22.6	25.77	24.31	23.59
SCV	0.32	0.26	0.25	0.26	0.26	0.28	0.23	0.23

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

Table 14

	Dehydration							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	3,023	3,938	3,574	3,953	4,478	4,680	5,212	5,672
Stand. Rate	4.5	5.92	5.24	5.82	6.52	6.69	7.43	7.91
sR Q1.	3.9	5.66	4.35	4.69	5.35	6.47	6.72	7.16
sR Q5.	4.8	5.74	5.5	5.83	7.64	6.13	7.31	7.68
SCV	0.39	0.41	0.33	0.28	0.34	0.22	0.25	0.27

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

Table 15

	Diabetes							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	2,543	2,463	2,626	2,652	2,726	2,563	2,540	2,420
Stand. Rate	1.45	1.38	1.55	1.52	1.55	1.49	1.44	1.34
sR Q1.	3.9	5.66	4.35	4.69	5.35	6.47	6.72	7.16
sR Q5.	4.8	5.74	5.5	5.83	7.64	6.13	7.31	7.68
SCV	0.27	0.2	0.53	0.25	0.25	0.29	0.3	0.17

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

APPENDIX 1:

Spain 2002-2009

Table 16

	Angina							
	2002	2003	2004	2005	2006	2007	2008	2009
Cases	33,454	32,479	30,957	28,142	27,404	25,962	23,159	20,856
Stand. Rate	19.01	18.5	18.28	16.64	16.57	15.5	13.87	12.69
sR Q1.	21.12	20.89	20.88	19.44	20.14	19.05	17.51	15.22
sR Q5.	14.10	13.50	14.05	11.64	12.55	11.27	10.57	9.45
SCV	0.31	0.32	0.36	0.38	0.42	0.42	0.41	0.51

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

APPENDIX 2: Technical note

Potentially avoidable hospitalisations are conceived 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 avoidable hospitalisations 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 and Component of Systematic Variation.

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 3. 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 3:

Definitions of indicators

	Diagnosis and procedures codes ICD9					
	Primary diagnosis		Secondary diagnoses		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Asthma +18 Age	493.00, 493.01, 493.02, 493.10, 493.11, 493.12, 493.81, 493.82, 493.90, 493.91, 493.92 OR 518.81 IF "diag2-30"=A		A) 493.00, 493.01, 493.02, 493.10, 493.11, 493.12, 493.81, 493.82, 493.90, 493.91, 493.92	Pregnancy, childbirth and the puerperium: 630-677 CHF: 428 402.01 402.11 402.91 404.01 404.03 404.11 404.13 404.91 404.93 398.91 Cystic fibrosis: 277.0 7472.1 748.3 748.4 748.5 748.6* 748.8 748.9 750.3 759.3 770.7 747.31* 747.32* 747.39* Mental disorders: 295.0*-295.9*, 296.0*-296.99, 297.0-297.9, 298.0-298.9, 300.0-300.9, 301.0-301.9 303.91, 304.01, 304.11, 304.21, 304.31, 304.41, 304.51, 304.61, 304.71, 304.81, 304.91, 316, Respiratory diseases: 494.0, 494.1, 515, 519.8, 519.9 COPD: 491.1, 491.20, 491.21, 491.22, 491.8, 491.9, 492.0, 492.8, 493.20, 493.21, 493.22, , 4940, 4941, 496		

	Diagnosis and procedures codes ICD9					
	Primary diagnosis		Secondary diagnoses		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Congestive Heart Failure +40 Age	398.91 402.01 402.11 402.91 404.01 404.03 404.11 404.13 404.91 404.93 428.0 428.1 428.20 428.22 428.23 428.30 428.32 428.33 428.40 428.42 428.43 428.9			Pregnancy, childbirth and the puerperium: 630-677 COPD 491.1 491.20 491.21 491.22 491.8 491.9 492 493.20 493.21 493.32 494 496 491 492 493 494 496 466.0 490 518.81 518.84 491.21 491.22 493.21 493.32 Ischaemic disease 410, 411.1, 411.8, 413 Kidney failure 403 404.00 404.02 404.10 404.12 404.90 404.92 584.5 584.6 584.7 584.8 584.9 585 586		
Chronic obstructive pulmonary disease (COPD) +18 Age	491.1, 491.20, 491.21, 491.22, 491.8, 491.9, 492.0, 492.8, 493.20, 493.21, 493.22, 494.0, 494.1, 49.6% OR 466.0 IF DX= "A)" or 490 IF DX= "A)" 518.81 IF DX= "B)" or 518.84 IF DX= "B)"		A) 491*, 492* 493* 494* 496* B) 491.21 491.22 493.21 493.22 494.0 494.1	Pregnancy, childbirth and the puerperium: 630-677 CHF 428 402.01 402.11 402.91 404.01 404.03 404.11 404.13 404.91 404.93 398.91 Cystic fibrosis: 277.0 747.21 748.3 748.4 748.5 748.6* 748.8 748.9 750.3 759.3 770.7 747.31 7473.2* 7473.9* Mental disorders: 295.0-295.9, 296.0*-296.99, 297.0-297.9, 298.0-298.9, 300.0-300.9, 301.0-301.9 303.91, 304.01, 304.11, 304.21, 304.31, 304.41, 304.51, 304.61, 304.71, 304.81, 304.91, 316,		

	Diagnosis codes ICD10 and Procedures codes OPCS					
	Primary diagnosis		Secondary diagnosis2-30		Procedures	
	Inclusions	Exclusions	Inclusions	Exclusions	Inclusions	Exclusions
Dehydration Admission +65 Age	276.0, 276.1, 276.5, 276.50, 276.51, 276.52					
Diabetes short-term complication +40 Age	250.10 250.11 250.20 250.21 25022 250.23 250.30 250.31 250.32 250.33			Pregnancy, childbirth and the puerperium: 630-677 Mental Disorders: 295.0*-295.9*, 296.0*-296.99 297.0-297.9, 298.0-298.9, 300.0-309, 301.0-301.9 303.91 304.01 304.11 304.21 304.31 304.41 304.51 304.61 304.71 304.81 304.91		
Angina without procedure +40 Age Urgent admissions	411.1, 411.81, 411.89, 413.0, 413.1, 413.9			Pregnancy, childbirth and the puerperium: 630-677		Cardiac Procedures (Annex 1)