Title:

Regional inequalities in self-reported conditions and non-communicable diseases in European countries: Findings from the European Social Survey (2014) special module on the social determinants of health

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Abstract

Background:

Within the European Union (EU), substantial efforts are being made to achieve economic and social cohesion, and the reduction of health inequalities between EU regions is integral to this process. This paper is the first to examine how self-reported conditions and non-communicable diseases (NCDs) vary spatially between and within countries.

Methods:

Using 2014 European Social Survey (ESS) data from 20 countries, this paper examines how regional inequalities in self-reported conditions and NCDs vary for men and women in 174 regions (level 1 and 2 Nomenclature of Statistical Territorial Units, 'NUTS'). We document absolute and relative inequalities across Europe in the prevalence of eight conditions: general health, overweight/obesity, mental health, heart or circulation problems, high blood pressure, back, neck, muscular or joint pain, diabetes and cancer.

Results:

There is considerable inequality in self-reported conditions and NCDs between the regions of Europe, with rates highest in the regions of continental Europe, some Scandinavian regions and parts of the United Kingdom and lowest around regions bordering the Alps, in Ireland and France. However, for mental health and cancer, rates are highest in regions of Eastern European and lowest in some Nordic regions, Ireland and isolated regions in continental Europe. There are also widespread and consistent absolute and relative regional inequalities in all conditions within countries. These are largest in France, Germany and the United Kingdom, and smallest in Denmark, Sweden and Norway. There were higher inequalities amongst women.

Conclusion:

Using newly available harmonized morbidity data from across Europe, this paper shows that there are considerable regional inequalities within and between European countries in the distribution of self-reported conditions and NCDs.

Keywords

Health inequalities

Europe

Morbidity

Spatial

Geography

Survey

1. Introduction

Reducing regional inequalities in Europe, including those associated with health, was a founding aim in the ECC Treaty of 1957 and reaffirmed in the 2007 Lisbon Treaty which promoted 'economic, social and territorial cohesion' through ever more regional and national harmonisation. Despite the long standing will of the European Community and member states to assimilate, inequalities in health have remained high. Whilst most research to date had focused on understanding inequalities between European countries [1-3], the work of Shaw et al.[4] has shown that using national health data can mask significant within country, regional variation. For example, it is well established that there is a North-South health divide in England [5, 6], whilst the East-West divide in Germany has reduced significantly since reunification in respect to both morbidity and mortality [6-8]. In addition, Richardson et al. [9] demonstrated that there are also significant regional inequalities in life expectancy across Europe.

Most previous comparative studies including Richardson et al.[9], use data collected by separate national administrations which may give rise to inconsistencies, particularly concerning data related to morbidity outcomes which may need to be harmonised. Our research uses data from the special module on the social determinants of health of the 2014 European Social Survey (ESS) and documents for the first time how various self-reported conditions and non-communicable diseases (NCDs) vary at sub-national level using data from a single source. Specifically, we investigate the geographical distribution of eight self-reported conditions and NCDs within European countries, and the scale of any regional inequalities within each country using data from the 2014 ESS.

2. Methods

Data

This study involved the analysis of the ESS conducted in 2014 (round 7). The data and documentation on the survey are provided freely and can be accessed through the ESS website (http://www.europeansocialsurvey.org). Data were gathered in 20 countries within Europe. Whilst most countries are in the European Union (Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Lithuania, Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, and the United Kingdom), others are in the European Free Trade Association (Norway and Switzerland). Random probability sampling from all private households with persons aged 15 and over was completed between August 2014 and December 2015. The average response rate was 51.6% for all countries in the ESS, but

ranged from 31.4% in Germany to 68.9% in Lithuania. This paper draws its data from the rotating module 'Social inequalities in health and their determinants' described in detail in Eikemo et al. [10]. A range of conditions were asked within the rotating module, including information on general health, limiting longstanding illness, BMI, mental health and self-reported NCDs. Eight variables were investigated in this paper; general health, overweight/obesity, mental health and heart or circulation problems, high blood pressure, pain, diabetes and cancer (Table 1). These were chosen as they represent some of the biggest public health issues which are facing Europe in 21st Century.

*****TABLE 1 INSERTED HERE*****

In keeping with previous research [9], regions were determined using the 'Nomenclature of territorial units for statistics' (NUTS) classification. NUTS is a hierarchical system for dividing up the economic territory of the EU. Areas are divided into three levels based on population, country administrative divisions or geographical units; NUTS 1, NUTS 2 or NUTS 3. NUTS 2 regions (with a typical population of 800,000 to 3 million) were used everywhere other than Germany and the UK which only release their data at the NUTS 1 level (population 3 – 7 million).

Analysis

Prevalence was calculated for each of the self-reported conditions and NCD variables at sub-national regions for respondents aged 18 plus[1]. Results are presented for all the population, and men and women separately. To calculate the regional prevalence of each condition across Europe, all data are weighted using two weights reported in the ESS: the population size (*pweight*) weight corrects for different population sizes between countries, and this was combined with a post-stratification weight (*pspweight*) which uses information on age-group, gender, education, and region to reduce the sampling error and potential non-response bias of the survey. To facilitate the comparison of regional prevalences across Europe which may have different population structures, we adjusted the crude prevalences in each area for five year age groups (up to aged 75 and above which were amalgamated) to a standard population (in keeping with the reporting of country prevalences by Huijts et al. [11]). The age groups were weighted in accordance with the European Standard population (ESP) of 2013 [12], which is an updated version of the 1976 ESP taking into account an aging European population. The ESP 2013 is available in spreadsheet format from ISD Scotland [13]. Within country, regional inequalities did not used the *pweight* and were not

[1] Respondents aged 15-17 (representing 3.1% of the ESS sample) were excluded from the analysis to ensure maturation of all participants and validity of the Body Mass Index calculation using height and weight alone.

age-standardised (as comparison between countries is not required and the *pspweight* does account for some regional differences). Sensitivity analysis using country-level population (obtained from Eurostat) showed the difference between regional prevalences were typically less than 1% different to those using the ESS weights alone and therefore not pursued further in subsequent analysis.

For regional analysis, a sample size of at least 100 respondents per NUTS region was required, and/or a minimum of 20 cases for each item in the instrument. The analysed data are represented in map, graphical and tabular form. Mapping was completed in ArcMap 10.3 using administrative boundaries downloaded Eurostat/EuroGeographics. For visualisation purposes, regions were aggregated into deciles based on cut-offs which include equal numbers of areas in each self-reported condition and NCD. To document regional inequalities, countries with fewer than five NUTS 2 (or NUTS 1) regions were excluded from analysis (following Bambra et al. [14]). This had the consequence that for some more rare conditions (e.g. diabetes), and particularly when examining prevalences of men and women separately, not all regions and/or countries sampled are included in the final analysis.

To calculate country-level regional inequalities, the absolute difference in prevalence between the region with the lowest and highest incidence of the particular health outcome investigated was also calculated, and tested for significance. This 'risk difference' was considered alongside the relative risk (or risk ratio) which calculates the ratio of risk of an event in the two regions. For all variables, the lowest regional prevalence was considered the 'exposed' group and was divided by the highest regional prevalence (the 'unexposed' group). As such, all risk ratios for this analysis are less than 1. To further quantify the scale of within-country inequalities, as an example, we calculate for the overweight/obese data the absolute weighted mean difference from the overall mean. This shows the difference of health in each region (weighted) from a reference point. Whilst a variety of measures to quantify subnational regional inequalities are available, the mean difference from the mean was chosen as it can be easily communicated to non-technical audiences [15]. As the ESS data were not purposively sampled at the regional level, we used population data for females and males respectively direct from Eurostat (table: demo_r_d22jan) for only those regions with sufficient data. The national coverage was calculated using only data for these regions in addition. Higher numerical values indicate more widespread inequalities.

*****FIGURE 1 INSERTED HERE*****

3. Results

Regional prevalence of self-reported conditions and NCDs across Europe

Figure 1 shows regional variation in self-reported conditions and NCDs for the total population in 20 countries included in the ESS (the raw data showing prevalences at NUTS 1/2 level is available from the corresponding author on request). Overall it is clear not only that all conditions affect substantial proportions of respondents, but we also see considerable variation in prevalences both across Europe and within individual countries. Direct comparison between all regions sampled in the ESS is however not possible as some data had to be excluded due to low sampling counts (illustrated using cross hatching on maps presented). Poor general health is highest in Hungary and in some eastern and southern European countries and lowest in Switzerland, Austria, and Ireland. For example in Észak-Magyarország (Hungary), the rate of poor general health is 19.24% compared to *ca.* 1% in Espace Mittelland in Switzerland. The prevalence of overweight/obesity is more spatially heterogeneous, with rates highest in parts of the United Kingdom, Scandinavia and central Germany and lowest in urban areas of Germany and Switzerland (e.g. Berlin, Zurich), Poland and central and north-west France. The prevalence of depressive symptoms is highest in parts of Hungary, Germany, Czech Republic and parts of Spain and Portugal where rates can reach > 30% and lowest in parts of Scandinavia (e.g. Agder and Rogaland in Norway 3.99%) and Switzerland. Heart and circulation problems are also spatially variable within regions of the EU with a range of over 17% between the least and most affected regions. For example in Wales (UK), only 3.37% of respondents reported problems during the past 12 months compared to the Thüringen region of Germany which has a rate of 21.15%. Problems associated with high blood pressure also show considerable regional variation across Europe ranging from less than 5% in Salzburg in Austria to around 40% in the Thüringen and the Sachsen-Anhalt areas of Germany. Rates of back or neck/ muscular or joint pain in the hand/arm or foot/leg however show the greatest range amongst the eight self-reported conditions reported here. The lowest rates are reported in parts of Hungary, the Czech Republic and Poland where typically less than 30% of the total population aged over 18 reports some kind of pain in the past 12 months compared to regions of France, Belgium and Sweden for which the percentage is considerably higher at around 80% of survey respondents. The prevalence of diabetes also displays a distinct patterning with the worst affected regions centring on northern Germany, Portugal, northern Finland, and parts of the United Kingdom with rates lowest in southern Germany and Switzerland. Finally, those survey respondents reporting cancer also varies across the regions of Europe: Poland, Spain and some Scandinavian regions report the lowest prevalences with rates highest in Hungary and Switzerland.

Although there are considerable regional differences amongst the eight self-reported conditions and NCDs examined here, some broad trends are evident in the maps presented in Figure 1. For self-rated health,

overweight and obesity, high blood pressure, pain (and a lesser extent diabetes), the prevalence of the particular condition of interest is highest in continental Europe (centred on North/East Germany), high also in some Scandinavian regions and parts of the United Kingdom and lowest around countries bordering the Alps, Ireland and some regions in France. No clear east-west gradient is evident, with prevalences showing considerable geographic variability between and within individual countries although for the maps of mental health and cancer, rates are highest in regions of Eastern European countries and lowest in some Nordic regions, Ireland and isolated regions in continental Europe.

*****FIGURE 2 INSERTED HERE*****

Within country regional inequalities in self-reported conditions and NCDs

Bar graphs of within-country absolute regional inequalities (high to low) for the total population in the eight conditions examined in this paper are detailed in Figure 2 (and full tables of all country-level regional inequalities for the total population, and men and women reported separately are displayed online in Additional file 1). For most of the conditions, the highest regional levels of inequality are found in France, Germany, the United Kingdom, Hungary and Austria. For example, the difference between the highest (Thüringen) and lowest (Rheinland-Pfalz) regions with a CES-D 8 depression score is 23.76%. France also displays persistent absolute inequality in many of the variables, for example there was a difference of 11.95% of respondents who have or have had heart or circulation problems between regions. In the Midi-Pyrenees region, just 5.83% of respondents claimed to have heart or circulation problems, compared to Aquitaine which had 17.78%. In comparison, Sweden, Denmark, Switzerland and Norway showed some of the smallest regional inequalities in self-reported conditions. There was only a 6.27% difference between Roskilde County and Frederiksborg County (Denmark) in pain. Furthermore, the eight valid regions of Sweden had a difference in overweight/obese status of just 12.03%, compared to Germany where this figure more than doubles (28.76%).

*****TABLE 2 INSERTED HERE*****

For some of the self-reported conditions it was possible to use the data from the ESS to investigate how regional inequalities vary between men and women. Unfortunately for many of the variables, the low sampling counts meant this was only meaningful for some of the most prevalent conditions (e.g. overweight/obese status). However, by combining the overweight/obese category we mask the difference

in health by different BMI categories[16]. Nevertheless, Figure 3 shows higher inequalities amongst women as reported elsewhere [17], and also significant regional variability between the sexes. For example women in Norway showed the highest levels of inequalities in overweight/obesity amongst countries in the ESS, with a difference of 36.75% between the most and least obese regions. In comparison, the men of Norway displayed the lowest levels of overweight/obesity with a regional difference of just 6.25%. The situation was reversed for United Kingdom where men had higher absolute and relative inequalities compared to women.

*****FIGURE 3 INSERTED HERE*****

The relative risk between the regions reporting the lowest and highest values for each of the self-reported conditions is shown in Table 2. Relative risks closest to 1 indicate little difference between regions, with those values closest to 0 indicating countries with the greatest inequalities. For example, in the United Kingdom, the region with the least prevalence of overweight/obesity (Greater London) had a risk of 0.634 of having a BMI greater than 25 compared to the region reporting the highest prevalence (North East) – or 37% less chance. The significance of the within-country regional inequalities using risk difference (where $p < 0.05$) is illustrated for each self-reported condition using an asterisk. From the table it is evident that regional inequalities are widespread and significant in France, Germany, the United Kingdom (and to a lesser extent in Spain, Poland and Hungary). Relative regional inequalities are not significant in Denmark and to a lesser extent Sweden and Norway. To illustrate the scale of inequalities across all regions, the weighted mean difference from the mean has been applied to the overweight/obese data (Table 3). The countries are ordered by the greatest absolute difference (low to high). It is evident that those countries with the greatest absolute difference generally also have high weighted mean difference calculations suggesting that inequalities are persistent across all regions. For example, women in Norway and Switzerland have the highest and lowest absolute inequalities between regions respectively and also the greatest (and least) inequalities across all regions. However women in Spain and men in Hungary for example, have a much higher weighted mean difference compared to their high to low absolute difference indicating widespread regional differences in the prevalence of overweight/obesity.

4. Discussion

The results presented here present a first examination of European regional inequalities in the prevalence of a range of self-reported conditions and NCDs from the new special rotating module on social inequalities in health developed for the 7th wave of the ESS (2014). Overall, we found considerable regional differences in prevalences amongst the eight self-reported conditions investigated within the European area. Most importantly, we found country-level regional inequalities are most noticeably smaller in some countries (e.g. Denmark) and larger and statistically significant in others (e.g. Germany, France and the United Kingdom). The study of regional geographic variations in health outcomes is still in its infancy, and this paper provides a unique overview of the extent and scale of regional variability between and within 20 countries in the European region. The significant regional variability illustrated in this paper underlines the importance of examining smaller geographic units when documenting health outcomes, something which is largely ignored in most comparative studies which typically report country-level health outcomes.

Our findings are largely in keeping with previous single country studies of regional inequalities in health. For example, research conducted in Germany, Finland and the UK has highlighted how distinct regional differences in diabetes prevalence are evident [18-20], potentially attributable to underlying structural deprivation operating at the contextual regional level, as well as compositional variables related to the socio-economic status or ethnic composition of the population living in these areas [18, 21]. However, there are some differences in the results described here with more detailed analysis conducted within individual countries. For example, the prevalence of depressive symptoms was 3.99% in Agder and Rogaland however research from the Norwegian Institute of Public Health [22] has highlighted Agder has a higher incidence of psychiatric symptoms and disorders than the rest of Norway, particular in younger age groups. Whilst this discrepancy could be associated with the self-reporting in the ESS compared to clinical diagnosis, is maybe a function of the sampling design, particularly the small number of cases in some regions. Also, for some countries (Denmark, Germany, Poland, Portugal, Slovenia, Spain, Sweden and the United Kingdom) statistical inference is not possible at the regional level (see 'ESS7 – 2014 Documentation Report' for further details [23]). As such, caution should exercised when interpreting results, and comparison to more comprehensive national studies should be undertaken alongside the analysis regional level described here. The ESS was never sampled for analysis at the regional level, so it may be possible that the respondents are not representative of the population at sub-national level. However, for all analyses the *pspweight* was used which incorporated information on age-group, gender, education as well as region to ensure these effects are minimised. However, the heterogeneity of self-reported health outcomes in small areas of Europe found in our study raises the possibility that regional-level health inequalities are reflecting underlying spatial differences in socioeconomic conditions. Therefore further analysis should focus on trying to explain these variations using modelling techniques incorporating compositional and contextual variables to understand the drivers of regional differences in self-reported conditions and NCDs.

This paper provides a unique insight into the extent of regional inequalities in self-reported conditions and NCDs over most of Europe by using a comparable dataset for 20 European countries. However, there are some limitations associated with the design and analysis of the data which may have methodological implications. Firstly, the low sampling counts for some of the self-reported conditions is a limitation of this study, in part due the pattern of sampling within the ESS which was not designed for complete and representative regional analysis. Consequently, for some of the self-reported conditions which are less common (such as diabetes or cancer), there are many regions for which comparison was not possible. For the same reason, documenting gender differences in many of the health outcomes is problematic except for the most common health outcomes (e.g. overweight/obesity), for which there are sufficient data. Secondly, whilst the focus of analysis was NUTS 2, for the United Kingdom and Germany only data at NUTS 1 was available. The unit of analysis (and the number of country subgroups) would change the prevalence of some of the regional analysis displayed here, particularly considering within-country regional inequalities. In the same way, even amongst the NUTS 2 regions, there are significant population differences in regions which would undoubtedly have implications for the results presented here. For example, the Luxembourg Province in Belgium has a population of 278,651, compared to La Réunion in France which has 839,334 people in 2014[24]. The low (and varying) response rate may also influence the results presented here. Whilst weighting is used to adjust for this potential bias, it is unclear without detailed knowledge of geographical distribution of health outcomes at country level, whether these are sufficient. Furthermore, whilst calculating the within-country regional differences, only the lowest and highest regional values for calculating risk difference and risk ratio are used across all health outcomes. This masks the scale and depth of inequality in any one country. Our analysis therefore measures the health 'gap' between regions. However our preliminary investigation using the absolute weighted mean difference suggests that for overweight/obesity the pairwise measure of high to low absolute difference is a reasonable approximation of the scale and depth of regional inequality across a country. Future work could focus more on the gradient, examining the possible role of deprivation (using for example the Slope Index of Inequality and Relative Index of Inequality) in the patterns we have found. Finally, the ESS uses self-reported data on NCDs, rather than clinical diagnosis.

5. Conclusion

This paper has examined how the prevalence of self-reported conditions and NCDs varies spatially between and within countries using a unique new harmonised data set: the European Social Survey special module on health inequalities in Europe from 2014. We have found that there is considerable inequality in conditions between the regions of Europe, with rates highest in the regions of continental Europe, some

Scandinavian regions and parts of the United Kingdom and lowest around regions bordering the Alps, in Ireland and France. However, for mental health and cancer, rates are highest in regions of Eastern European and lowest in some Nordic regions, Ireland and isolated regions in continental Europe. There are also widespread and consistent absolute and relative regional inequalities in all self-reported conditions and NCDs within countries. These are largest in France, Germany and the United Kingdom, and smallest in Denmark, Sweden and Norway. There were higher inequalities amongst women. Future research should explore the underlying reasons for these inequalities. These large relative and absolute differences across Europe imply that a more concerted effort at both the national and EU level is needed to tackle regional inequalities. Successfully evaluated interventions shown to reduce regional health inequalities should be adopted across Europe (perhaps using EU structural funds), coordinated by policy makers in order to plan and deliver successful public health strategies to harmonise regions and finally realise the aims of the ECC Treaty from 1957.

6. Acknowledgements

This article is part of the HiNEWS project – Health Inequalities in European Welfare States funded by the NORFACE (New Opportunities for Research Funding Agency Cooperation in Europe) Welfare State Futures programme (grant reference:462-14-110). For more details on NORFACE see www.norface.net/11.

7. Tables and Figures

348 **Table 1** Self-reported conditions and NCD variables taken from the ESS rotating module on 'Social
349 inequalities in health and their determinants'.

Variable	Variable description and/or ESS question	ESS7 Question No.
Self-rated health (poor health)	How is your health in general? Would you say it is: • Very good • Good • Fair • Bad • Very bad Self-rated health graded poor/very poor (as oppose to fair/good/very good)	C7
Overweight/ obesity	Self-reported height and weight converted to BMI. Overweight/ obese (BMI > 25) as opposed to underweight/ normal (BMI < 25).	E11 E12
Mental health	Depression measured using the eight-item version of the Centre for Epidemiological Studies Depression Scale (CES-D8)[25] dichotomised to above or below depression cut-off value (10 out of 24), as outlined in Huijts et al. [11] .	E20-27
Heart or circulation problems	Which of the health problems [detailed below] have you had or experienced in the last 12 months? • Heart or circulation problems	E28
High blood pressure	Which of the health problems [detailed below] have you had or experienced in the last 12 months? • High blood pressure	E28
Back or neck pain/muscular or joint pain in hand/arm or foot/leg	Which of the health problems [detailed below] have you had or experienced in the last 12 months? • Back or neck pain • Muscular or joint pain in hand or arm • Muscular or joint pain in foot or leg	E28
Diabetes	Which of the health problems [detailed below] have you had or experienced in the last 12 months? • Diabetes	E28
Cancer	Do you have or have you ever had: • cancer affecting any part of the body • leukemia • malignant tumor • malignant lymphoma • melanoma, carcinoma, or other skin cancer	E30

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Table 2 Within country regional inequalities. Relative risk (high to low relative ratio) is shown between regions for the total population for each self-reported condition and NCD (confidence intervals at 95% shown in brackets). Significance using risk difference is signified with an asterisk (where $p < 0.05$).

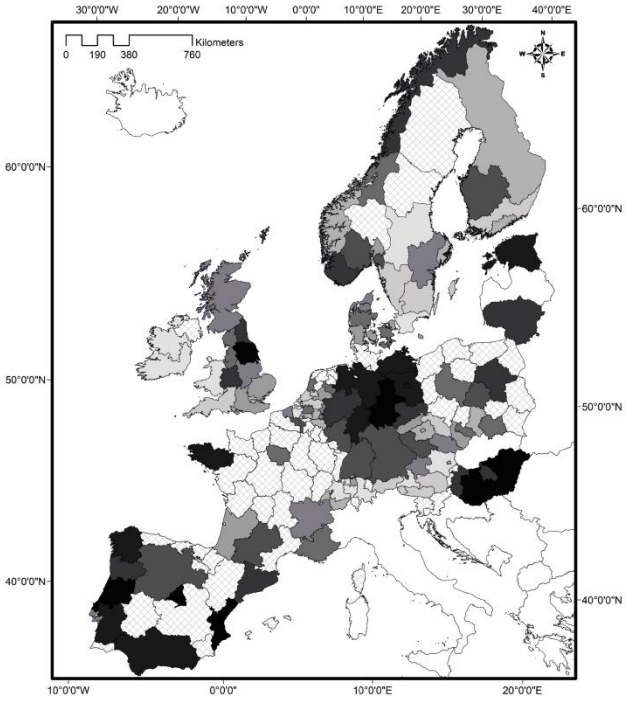
Country	Self-rated poor health	Overweight/ obesity	Depression	Heart or circulation problems	High blood pressure	Pain	Diabetes	Cancer
Austria	0.311 (0.032 – 3.059)	0.659 (0.421 – 1.030)	0.629 (0.299 – 1.266)	0.341 (0.070 – 1.655)	0.198 * (0.044 – 0.890)	0.528 * (0.294 – 0.950)	0.284 (0.020 – 3.966)	0.361 (0.099 – 1.310)
Belgium	0.467 (0.133 – 1.648)	0.685 * (0.492 – 0.955)	0.295 * (0.115 – 0.755)	0.368 (0.123 – 1.101)	0.346 * (0.142 – 0.842)	0.695 * (0.540 – 0.893)	0.331 (0.083 – 1.321)	0.513 (0.192 – 1.367)
Czech Republic	0.491 (0.161 – 1.495)	0.680 * (0.529 – 0.875)	0.505 * (0.272 – 0.937)	0.329 (0.100 – 1.079)	0.539 (0.274 – 1.060)	0.448 * (0.293 – 0.686)	0.392 (0.097 – 1.584)	-
Denmark	0.653 (0.214 – 1.986)	0.857 (0.562 – 1.306)	0.613 (0.270 – 1.393)	0.559 (0.215 – 1.451)	0.646 0.358 – 1.163)	0.910 (0.737 – 1.122)	0.625 (0.125 – 3.117)	0.517 (0.238 – 1.119)
France	0.528 * (0.323 – 0.863)	0.708 * (0.609 – 0.823)	0.519 * (0.319 – 0.844)	0.328 * (0.200 – 0.538)	0.501 * (0.341 – 0.734)	0.576 * (0.501 – 0.661)	0.466 * (0.255 – 0.852)	0.636 * (0.427 – 0.949)
Germany	0.413 * 0.243 – 0.701)	0.596 * (0.496 – 0.715)	0.198 * 0.119 – 0.331)	0.520 * (0.368 – 0.736)	0.517 * (0.413 – 0.647)	0.757 * (0.668 – 0.858)	0.159 * (0.094 – 0.269)	0.616 * (0.449 – 0.845)
Hungary	0.606 (0.272 – 1.351)	0.728 * 0.583 – 0.910)	0.442 * (0.299 – 0.652)	0.190 * (0.053 – 0.685)	0.127 * (0.040 – 0.397)	0.338 * (0.188 – 0.607)	0.306 (0.068 - 1.377)	0.216 * (0.088 – 0.531)
Netherlands	0.478 (0.182 – 1.254)	0.588 * (0.364 – 0.951)	0.538 (0.214 – 1.353)	0.464 * (0.220 – 0.976)	0.713 (0.408 – 1.247)	0.473 * (0.261 – 0.859)	0.511 (0.143 – 1.822)	0.616 (0.270 – 1.405)
Norway	0.392 (0.095 – 1.609)	0.639 * (0.453 – 0.903)	0.339 0.066 – 1.734)	0.585 (0.139 – 2.465)	0.524 (0.220 – 1.244)	0.771 (0.576 – 1.031)	0.226 (0.018 – 2.880)	0.456 (0.139 – 1.501)
Poland	0.562 * (0.336 – 0.940)	0.601 * (0.490 – 0.737)	0.652 * 0.456 – 0.934)	0.820 (0.561 – 1.199)	0.468 * (0.313 – 0.700)	0.454 * (0.348 – 0.593)	0.649 0.307 – 1.372)	0.392 * (0.205 – 0.749)
Portugal	-	0.734 (0.556 – 0.969)	-	-	-	0.689 * (0.467 – 1.018)	-	-
Spain	0.590 * (0.357 – 0.978)	0.815 * (0.637 – 1.041)	0.655 * (0.440 – 0.975)	0.464 * (0.247 – 0.872)	0.652 * (0.436 – 0.974)	0.628 * (0.494 – 0.798)	0.565 (0.263 – 1.213)	0.647 (0.299 – 1.399)
Sweden	0.373 (0.089 – 1.559)	0.799 (0.615 – 1.038)	0.574 (0.218 – 1.507)	0.516 (0.224 – 1.190)	0.663 (0.340 – 1.293)	0.712 * (0.571 – 0.887)	0.381 (0.096 – 1.508)	0.411 * (0.178 – 0.946)
Switzerland	0.165 * (0.028 – 0.985)	0.689 (0.453 – 1.048)	0.554 0.210 – 1.463)	0.499 (0.172 – 1.447)	0.818 (0.368 – 1.819)	0.731 * (0.565 – 0.947)	0 (0 - ∞)	0.560 (0.294 – 1.066)
United Kingdom	0.233 * (0.119 – 0.454)	0.634 * (0.563 – 0.714)	0.403 * (0.286 – 0.569)	0.329 * (0.198 – 0.549)	0.572 * (0.440 – 0.744)	0.705 * (0.599 – 0.831)	0.362 * (0.184 – 0.712)	0.432 * (0.267 – 0.701)

Table 3 Absolute weighted mean difference from the overall mean calculated for the percentage of overweight/obesity for females and males separately. Countries weighted by population (from table 'demo_r_d2jan' taken from Eurostat). Countries are ordered by their high to low absolute difference (taken from Figure 2).

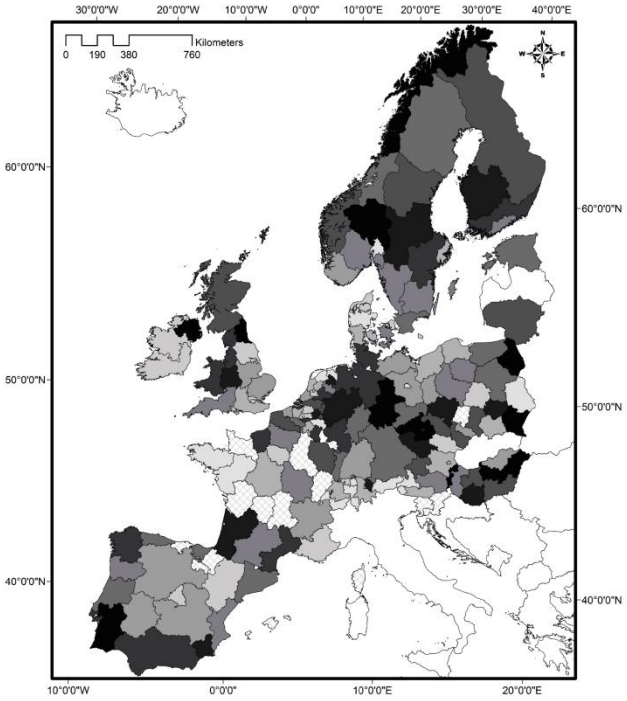
FEMALES			
Country		Weighted mean difference	Weighted mean difference (order)
1	Norway	9.579	1
2	Czech Republic	7.416	3
3	France	6.531	4
4	Germany	5.919	5
5	United Kingdom	5.092	8
6	Hungary	8.056	2
7	Netherlands	3.019	13
8	Belgium	3.846	11
9	Poland	3.877	10
10	Portugal	4.047	9
11	Austria	5.315	7
12	Spain	5.587	6
13	Sweden	3.725	12
14	Switzerland	1.809	14

MALES			
Country		Weighted mean difference	Weighted mean difference (order)
1	United Kingdom	6.648	2
2	Spain	5.153	5
3	Czech Republic	7.729	1
4	Austria	3.162	12
5	France	6.375	3
6	Germany	3.997	11
7	Poland	4.527	6
8	Sweden	4.096	10
9	Belgium	4.152	9
10	Hungary	5.643	4
11	Switzerland	4.492	7
12	Netherlands	4.217	8
13	Denmark	2.283	13
14	Norway	1.938	14

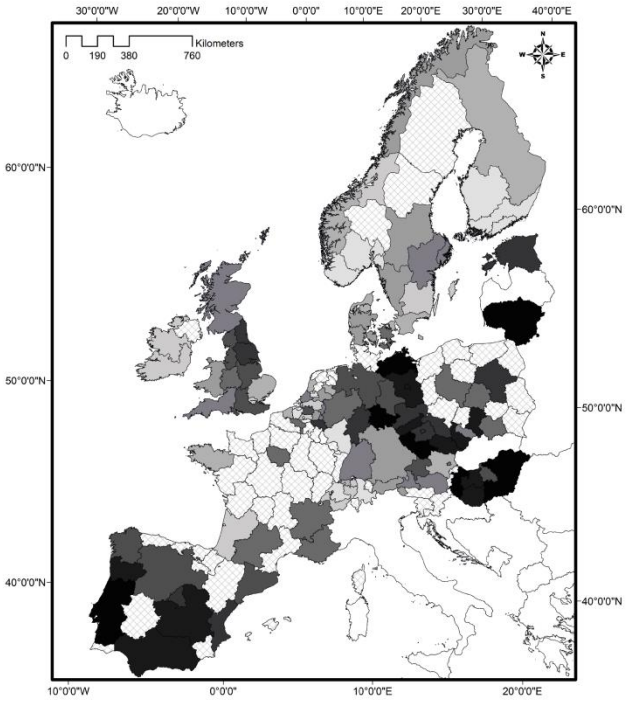
Self-rated poor health



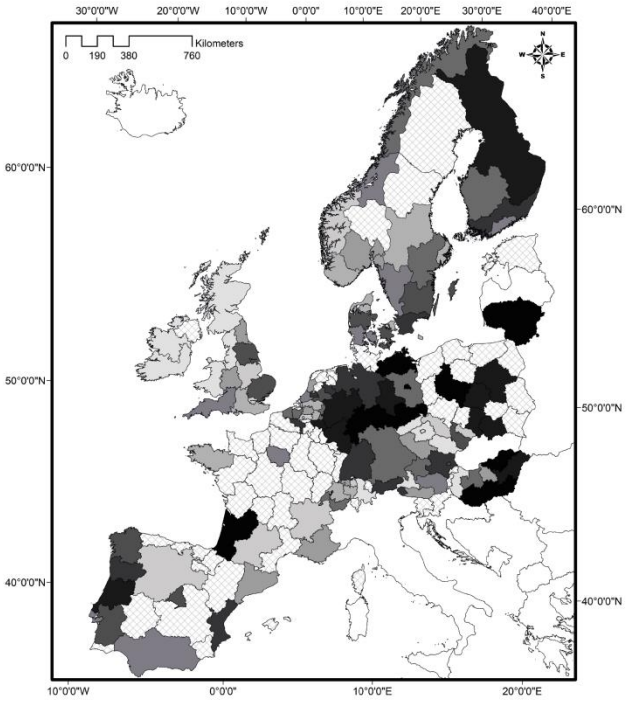
Overweight and obese



Mental health



Heart or circulation problems



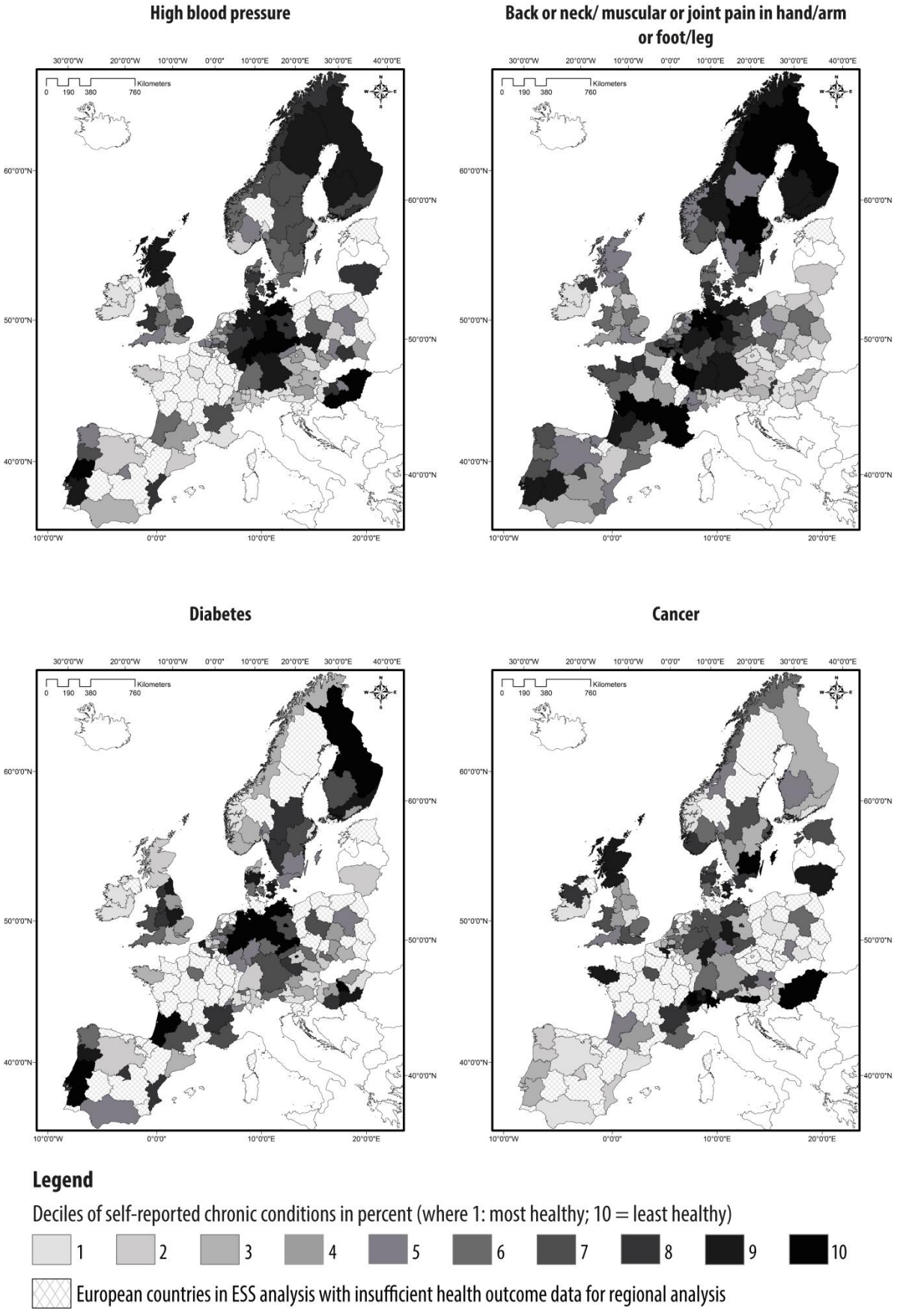


Figure 1 Regional prevalence's in self-reported conditions and NCDs for the total population at NUTS 2 (except for Germany and the UK where data are only available at NUTS 1). Administrative boundaries from EuroGeographics.

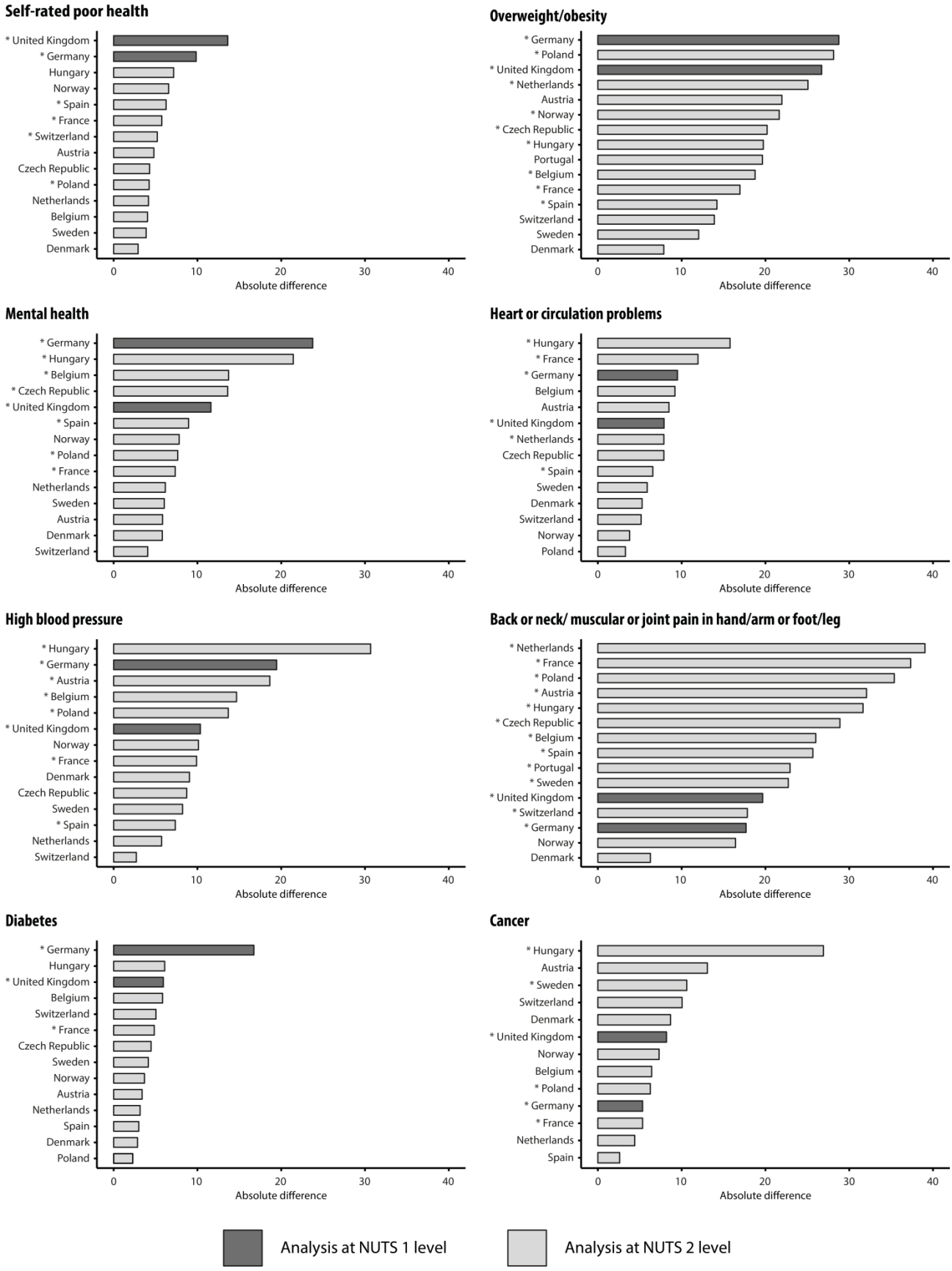


Figure 2. Regional inequalities in self-reported conditions and NCDs. The high to low absolute difference (in percentage points) represents the within-country difference in regional prevalence of each of the self-reported conditions. The asterisks represents countries which have a significant risk difference (where p = < 0.05).

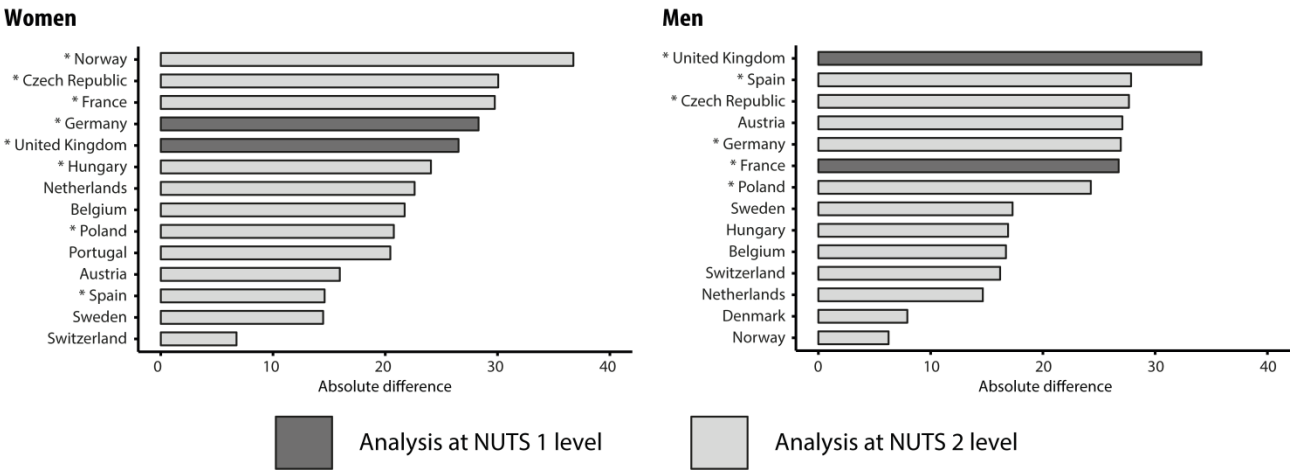


Figure 3 Country-level regional inequalities in overweight/obesity status in women (left) and men (right). The high to low absolute difference (in percentage points) represents the within-country difference in regional prevalence in the prevalence of overweight/obese status. The asterisks represents countries which have a significant risk difference (where p = < 0.05).

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