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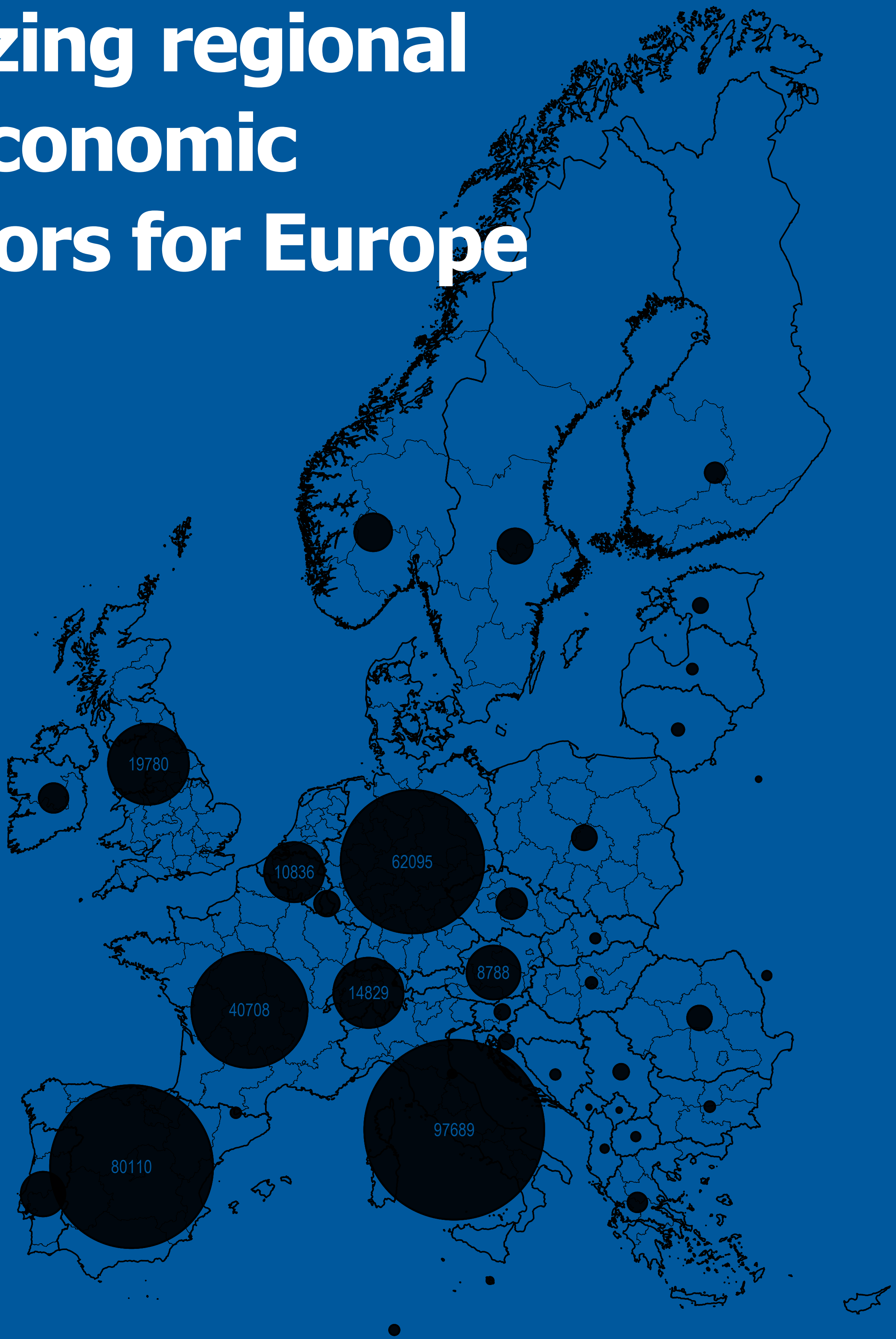

COVID-19: Visualizing regional socioeconomic indicators for Europe

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Preface

The COVID-19 pandemic struck the world out of the blue and displayed unprecedented transmission rates. Part of the reason for its rapid worldwide spread, was the nature of the virus itself, its presentation (symptoms were visible well after a person was infected) and the highly complex, interconnected world we live in today. An equally important contributing factor is our, now apparent, collective inability to deal with a rapidly emerging global threat in a coherent and integrated manner across countries and continents. Our existing multilateral systems are simply not yet geared to respond to such an emerging global challenge in an adequate and timely manner. The plethora of national responses have also been shown to be inadequate.

The extent of our inter-connectedness has led us to recognize that we live in a global village, and this pandemic has removed any remaining doubts. However, the underlying global order of pervasive tourism, trade, business, education has the potential to create vulnerabilities while also generating critical sector specific information that could be systematically harnessed in order to allow rapid and effective global and national responses to risks. Undoubtedly this data is being collected in some form. At a more operational level the world is still struggling to bring together the necessary data from across different sectors of society, across scales and a sufficiently integrated manner to fully enable a rapid analysis and a comprehensive disaster risk mitigation response. The looming era of machine learning and artificial intelligence too has the potential to fast-track our capabilities and responsiveness to such epidemics, but presently, we are still struggling to access relevant information and timely data at appropriate scales and resolutions.

Early information from the COVID-19 pandemic suggested a greater vulnerability of older citizens to the virus. Current mortality patterns support the notion that the elderly, especially those with underlying medical conditions, are more vulnerable. However, clearly, all segments of the population are vulnerable. In the absence of an available cure for the virus, key measures deployed to limit transmission include to curb mobility, social distancing, to strengthen the medical infrastructure to improve the palliative treatment for vulnerable patients (ventilators) and protect key medical practitioners (protective clothing and masks). A fully functional coordinated system of international cooperation would help with the effective execution of many of these measures. Given that the pandemic has now reached nearly all countries around the world and is still spreading, countries are responding by shutting borders and are competing for scarce resources – medical, technical, and/or financial. The developing geography of the pandemic illustrates how different countries become more vulnerable at different times during the development of the pandemic – not all countries are necessarily equally vulnerable at the same time. The same principle applies to different parts within a country (Northern Italy, New York). In understanding these differences, mortality rates are probably a more robust indicator, albeit delayed, considering the different modes and extents of COVID-19 testing implemented around the world.

Clearly COVID-19 has caught all of us off guard, yet we need to respond to the emerging crisis to the best of our ability. While numerous epidemiological analyses and models are currently informing and assisting global decision makers to respond to the virus, we at IIASA can assist by making available critical socioeconomic and demographic data that may be of use to policymakers and the health community to allocate scarce resources more strategically between countries and even within countries.

This IIASA mapbook is made available to rapidly and urgently disseminate key demographic and population information in a visible form to assist health professionals, disaster response operations, governments and policymakers from across the European Union. This IIASA mapbook publishes and will continue to expand on a list of key indicators that can be used to better understand the socioeconomic and demographic contexts under which the current COVID-19 crisis is unfolding. Accessible data is presently limited to the EU.

Albert Van Jaarsveld

Director General

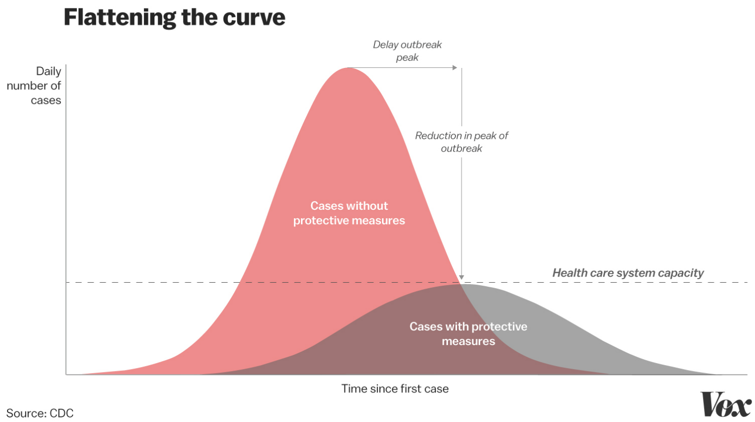
Leena Srivastava

Deputy Director General for Science

1 Introduction

The recent Corona virus (COVID–19) outbreak in the EU has drastically impacted daily life across all age groups. Current estimates suggest that the 65 plus and especially 80 plus age group are at the highest risk from the virus. This is particularly important in the EU, which not only has an aging population, but there are also huge variations across regions in terms of economic development. The combination of these two points implies that different regions face different challenges in terms of spread of the virus, burden on the public health and social security system, and economic losses.

Fig. 1: Flattening the curve



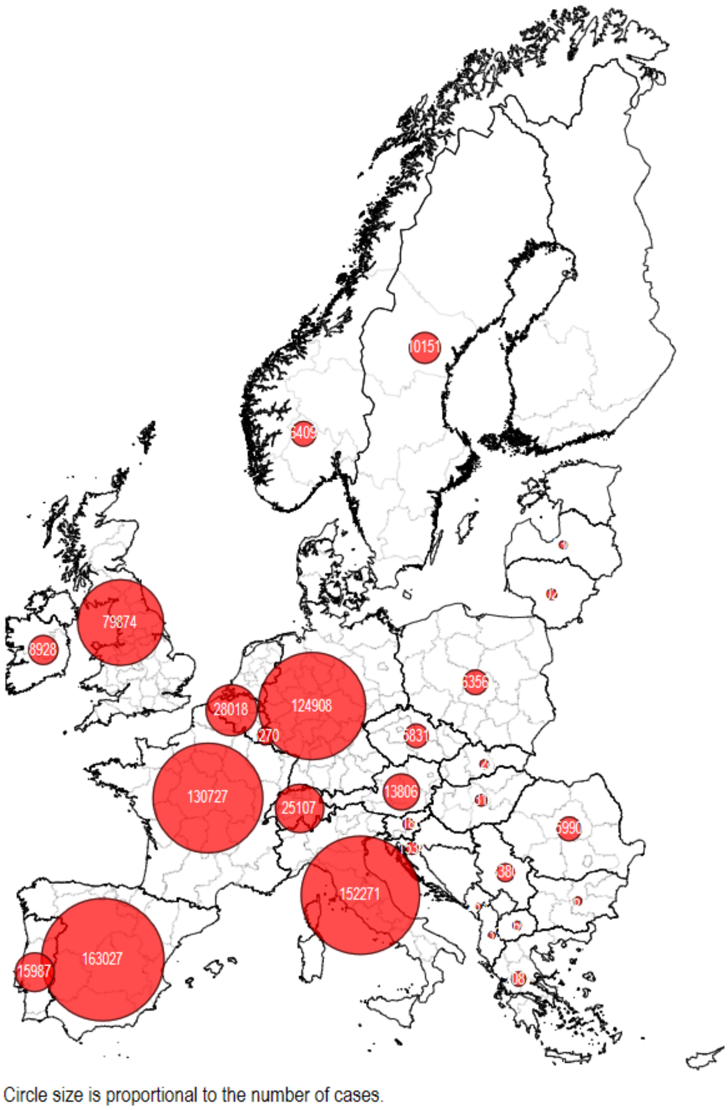
Source: https://www.vox.com/2020/3/10/21171481/coronavirus-us-cases-quarantine-cancellation

The spread of the virus in Italy has forced EU countries to take drastic measures like shutting down public spaces, schools, and businesses, and limiting mobility and human interaction, a phenomenon that is referred to as "social distancing" with the aim of "flattening the curve". In other words, the less the interactions, the slower the spread of the virus, and the better the health care system is capable of handling it.

Figure 2 shows the actual number of reported cases on 13 April, 2020. The figure highlights large variations in the number of cases represented by different bubble sizes. While Italy was the first to be massively hit, other countries like Spain, France, Germany, Belgium, UK, Ireland have also seen very high growth. These numbers, while important, need to be taken into consideration with a host of socioeconomic factors to properly understand the full impact of the virus. For example, population size, policy stringency and health system are key in the short run to look at the direct mitigation efforts. Other impacts like unemployment, production losses, supply-chain disruptions, also need to be systematically understood both for a better understanding of immediate impacts and long-run policy planning.

In order to understand these impacts, this document presents a series of graphs and maps that aim to visually explore demographic, socioeconomic, and health-related indicators for NUTS 2 regions in European. NUTS stands for Nomenclature of Territorial Units for Statistics that exist at four levels.

Fig. 2: Number of COVID-19 cases (April 16, 2020)



Source: John Hopkins University (JHU) Coronavirus Resource Center (https://coronavirus.jhu.edu/map.html). Data retrieved on document compilation date (see page 2).

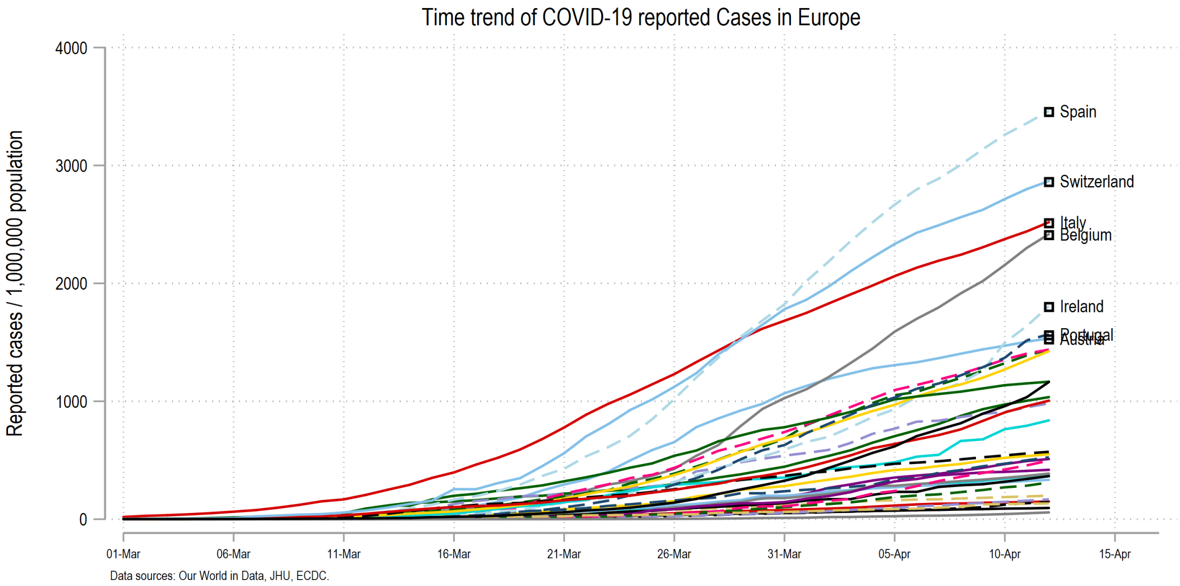
NUTS 0 represent countries, NUTS 1 represent provinces, NUTS 2 are districts within provinces, and NUTS 3 are finer level subdivisions usually representing counties within districts.[1]

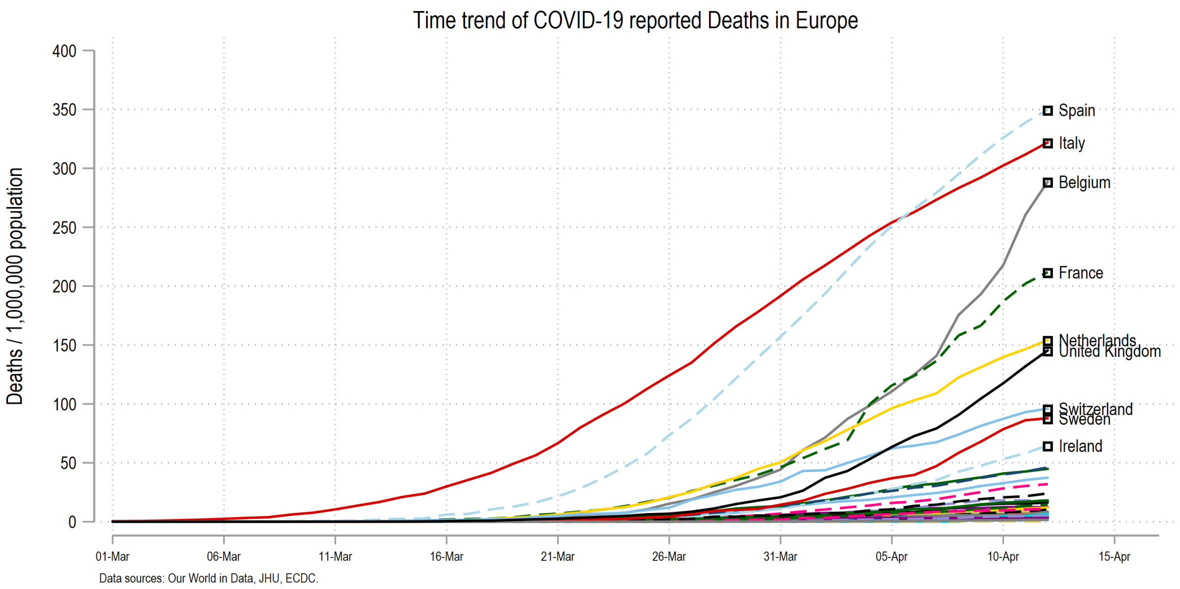
The data for this project has been compiled using publicly available information from the Eurostat database (https://ec.europa.eu/eurostat/data/database). Selected indicators from this database are used to showcase regional variations in the EU in relationship to the Corona virus (COVID-19). This document will be regularly updated to reflect changes in reported cases and update the maps.

[1] For more information, see Eurostat https://ec.europa.eu/eurostat/web/nuts/background

2 Current COVID-19 trends (April 16, 2020)

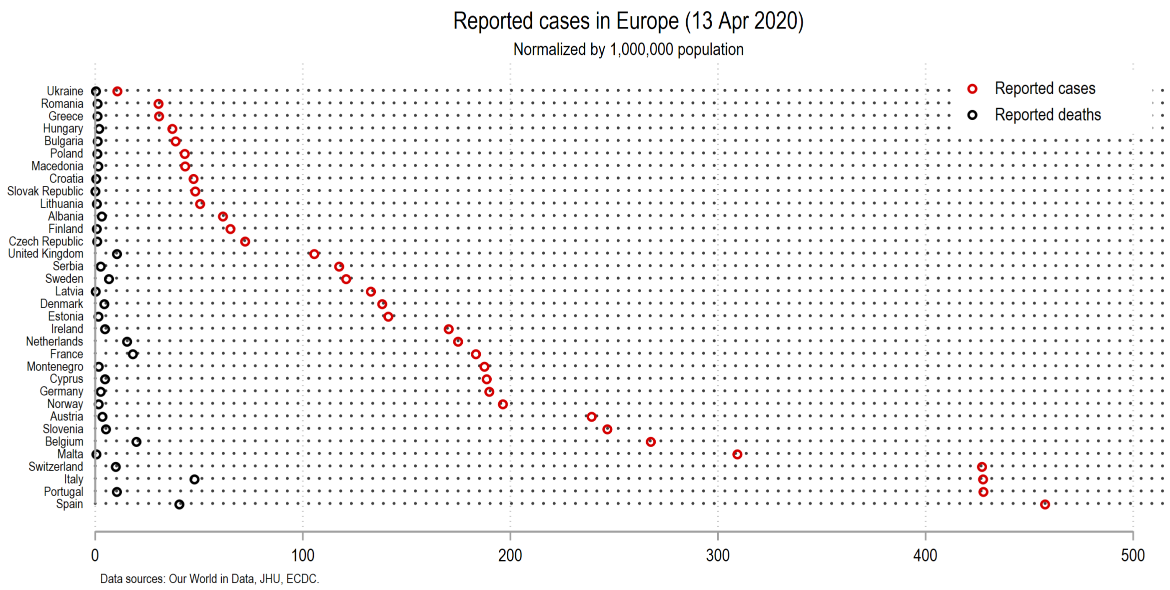
Fig. 3: Reported cases and deaths

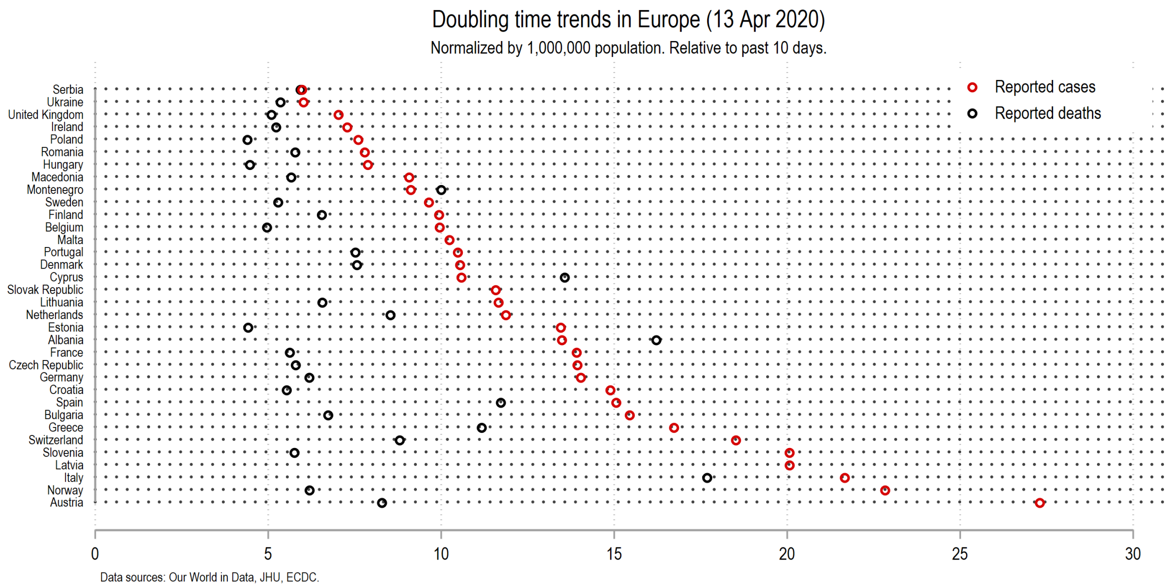




Note: The figures show the trends across European countries starting 1st March. Italy while showing the highest increase in the beginning has been overshadowed by Spain and Switzerland in cases per population. The growth rates in Belgium and Ireland show that will likely take over Italy as well. The number of deaths per population are also rising exponentially in Belgium, Spain, France, Netherlands, and the UK.

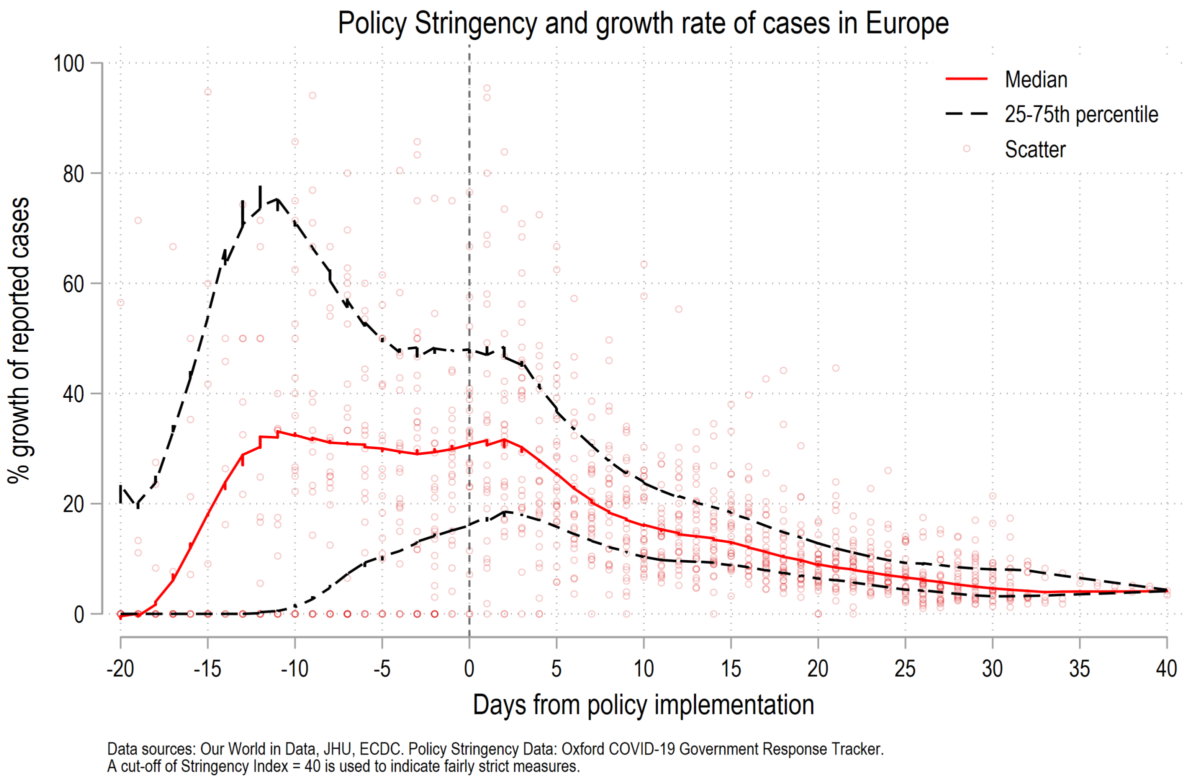
Fig. 4: Country ranks and Doubling time





Note: The first figure shows that number of reported cases and deaths. The second figure shows the *doubling time*, or how fast are the cases doubling relative to the past 10 days. Here we see that Austria has slowed down the growth of cases considerably with the lock-down measures also working in Italy and Norway. Countries below 10-14 days can be considered critical.

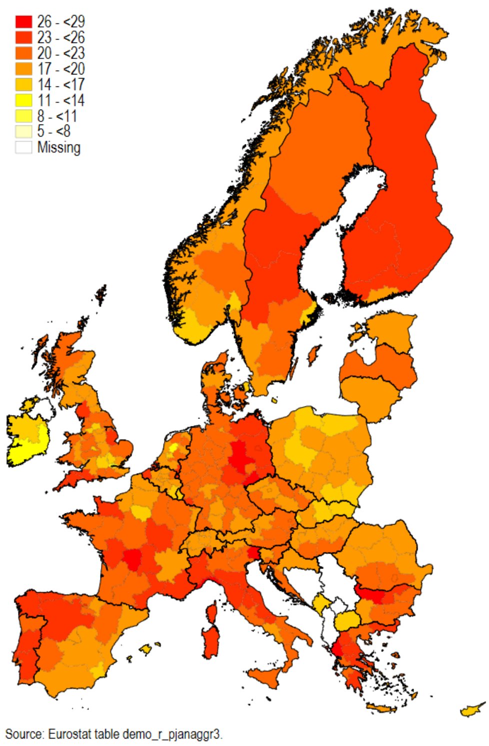
Fig. 5: Policy response



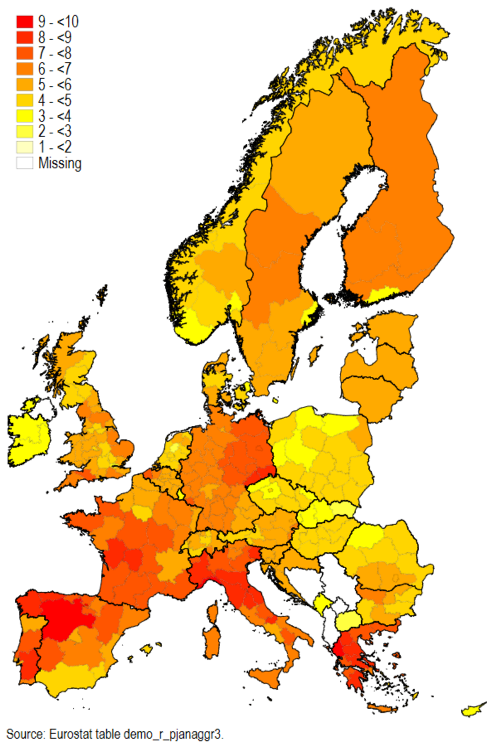
Note: The COVID-19 Policy Stringency Index is generated by the Oxford Government Response tracker (https://www.bsg.ox.ac.uk/research/research-projects/oxford-covid-19-government-response-tracker.). Here a cut-off of 40 is selected to represent a strong policy response in limiting physical interactions amongst the population. The date at which these policies are implemented is labeled at Day 0 and pre and post growth of cases is tracked. Here we see that strong policies matter in slowing down the growth of reported cases across the board.

3 Demographic indicators

Fig. 6: Percentage share of old population



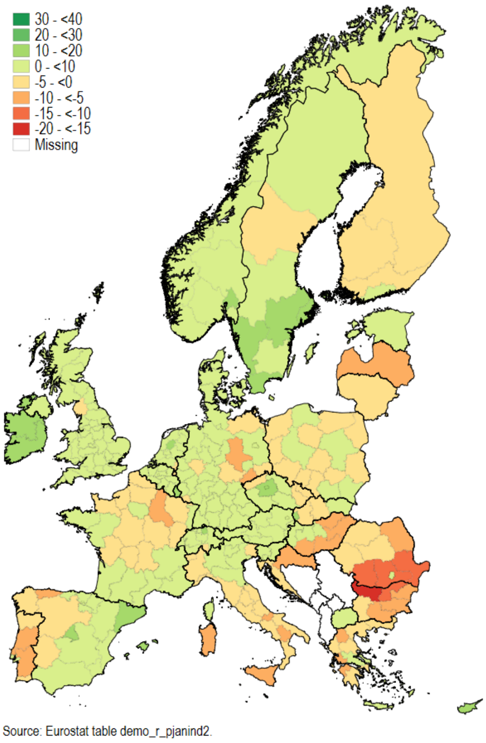
(a) Age 65 and above (2019)



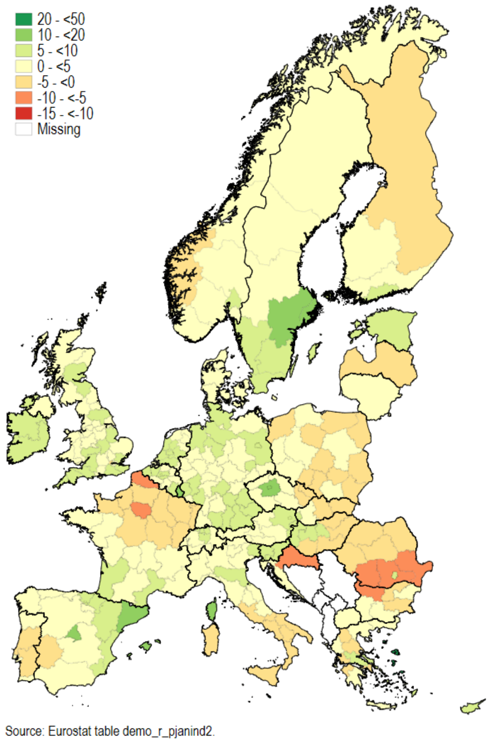
(b) Age 80 and above (2019)

Figures (a) and (b) presents the share of population aged 65 years and over and 80 years and over, respectively.

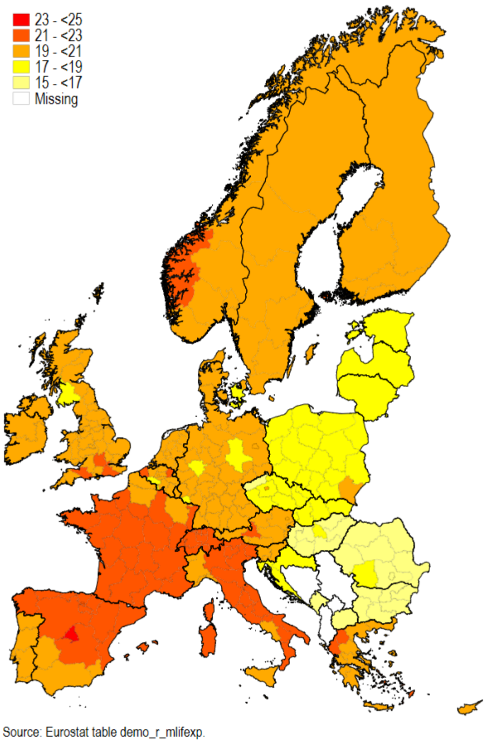
Fig. 7: Migration and population changes



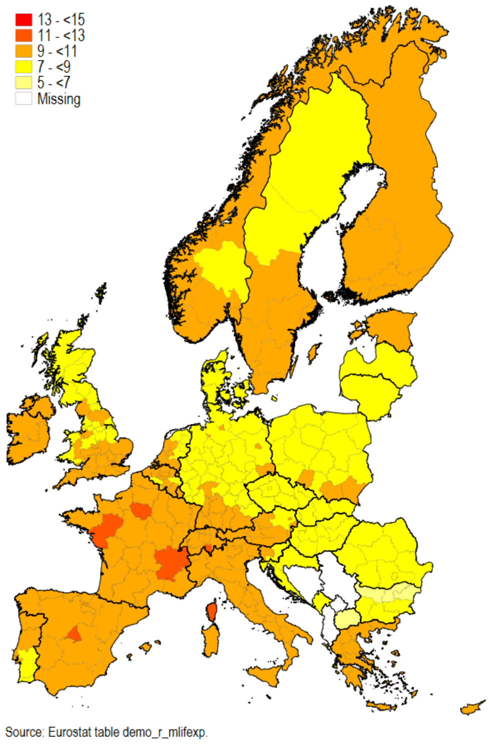
(a) Population growth rate (2018)



(b) Net migration rate (2018)

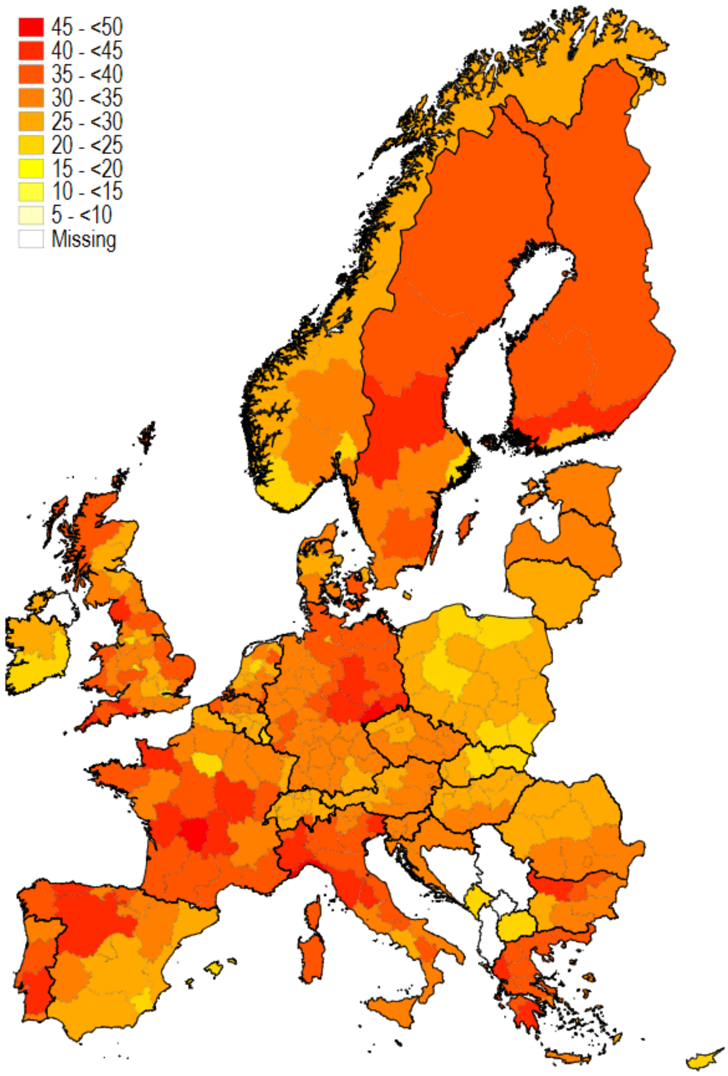


(c) Life expectancy at age 65 years old (2018)



(d) Life expectancy at age 80 years old (2018)

Fig. 8: Old dependency ratio in % (persons aged 65 and over/persons age 15-64) (2019)

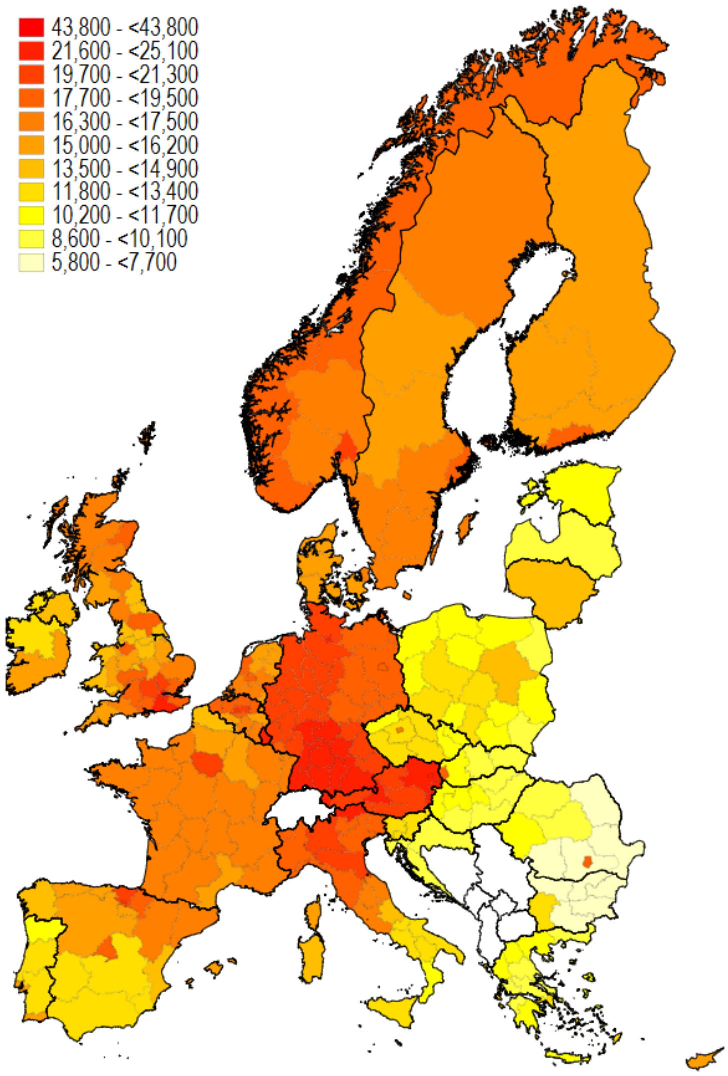


Source: Eurostat table demo_r_pjanind2.

The old dependency ratio is a standard indicator used in demographics to indicate the share of population age 65 and over to working age population. Within the EU regions, this number is considerably high, in some places reaching 50%, implying that there is one 65+ people for every two working age people. This has strong implications for inter-generational public health, social security, and pension transfers.

4 Economic indicators

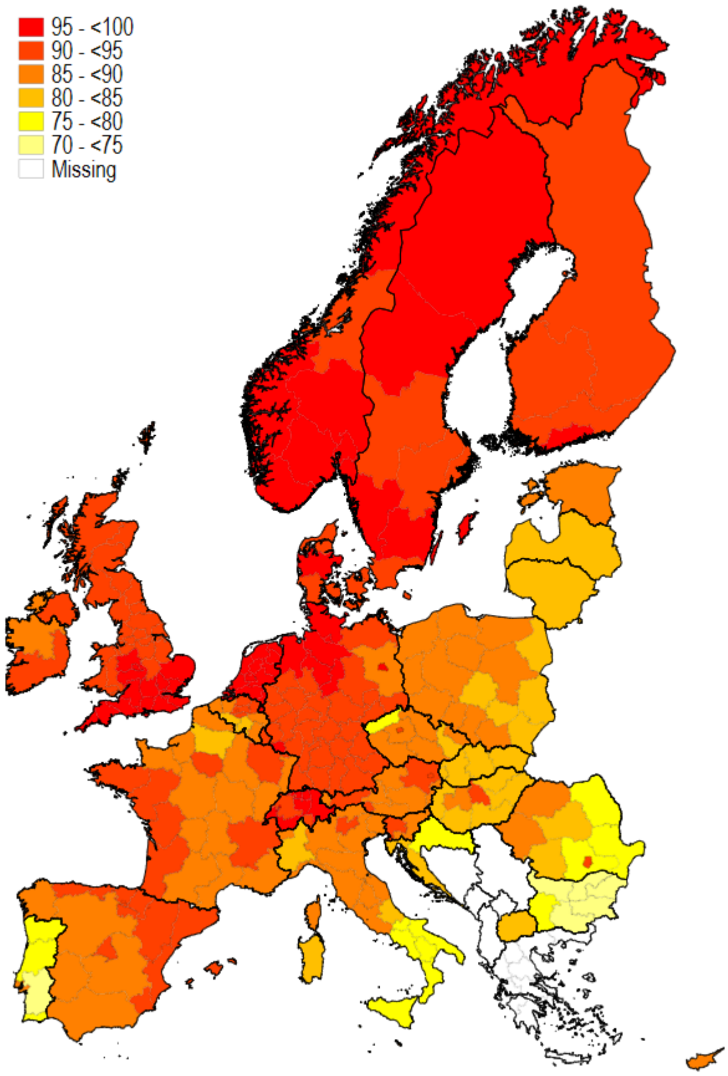
Fig. 9: Average household income (2017)



Source: Eurostat table nama_10r_2hhinc.

Income is an indicator of a coping mechanism. As the figure shows, there is a huge variation between the central “core” and the eastern and southern “periphery” regions.

Fig. 10: Percentage of population with internet access (2019)

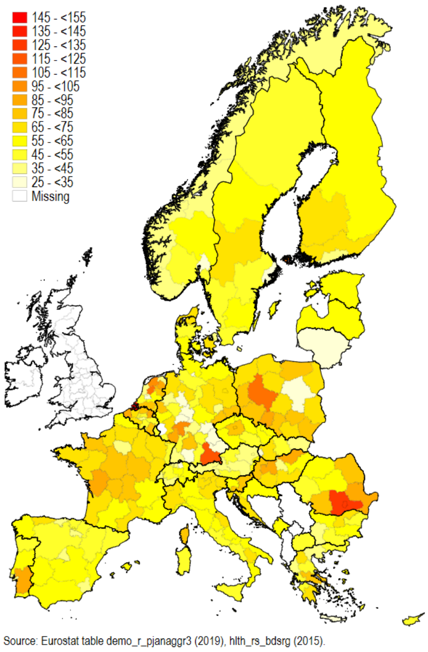


Source: Eurostat table isoc_r_iacc_h.

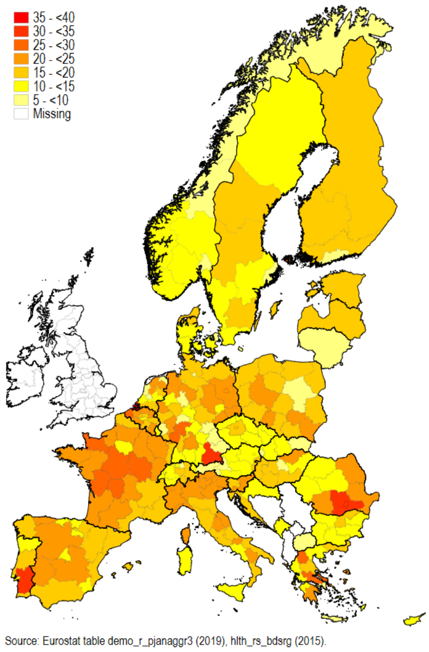
This map indicates the percentage share of population that has access to any type of internet.

5 Health-related indicators

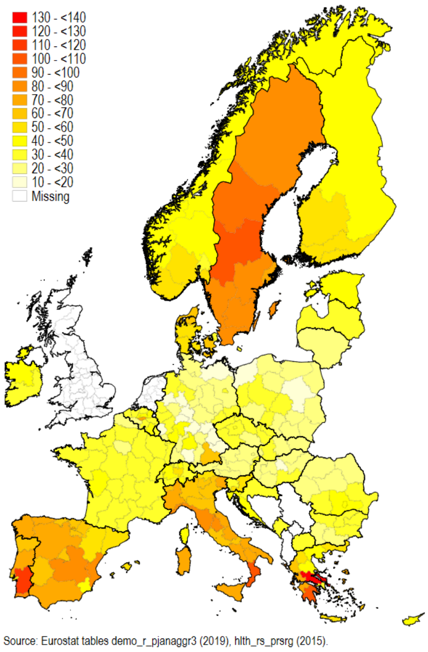
Fig. 11: Doctors and Hospital beds



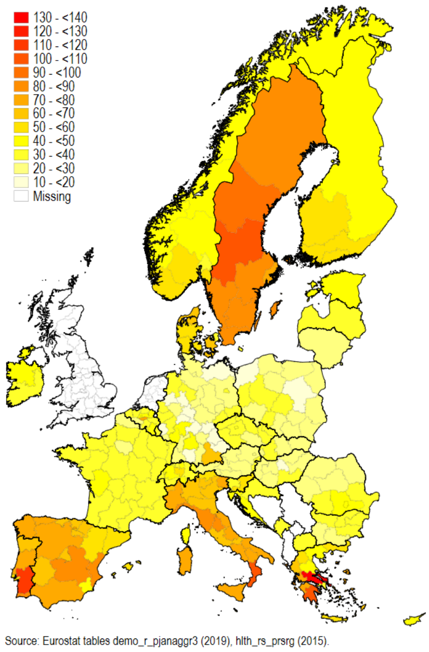
(a) Share of 65+ to doctors



(b) Share of 80+ to doctors



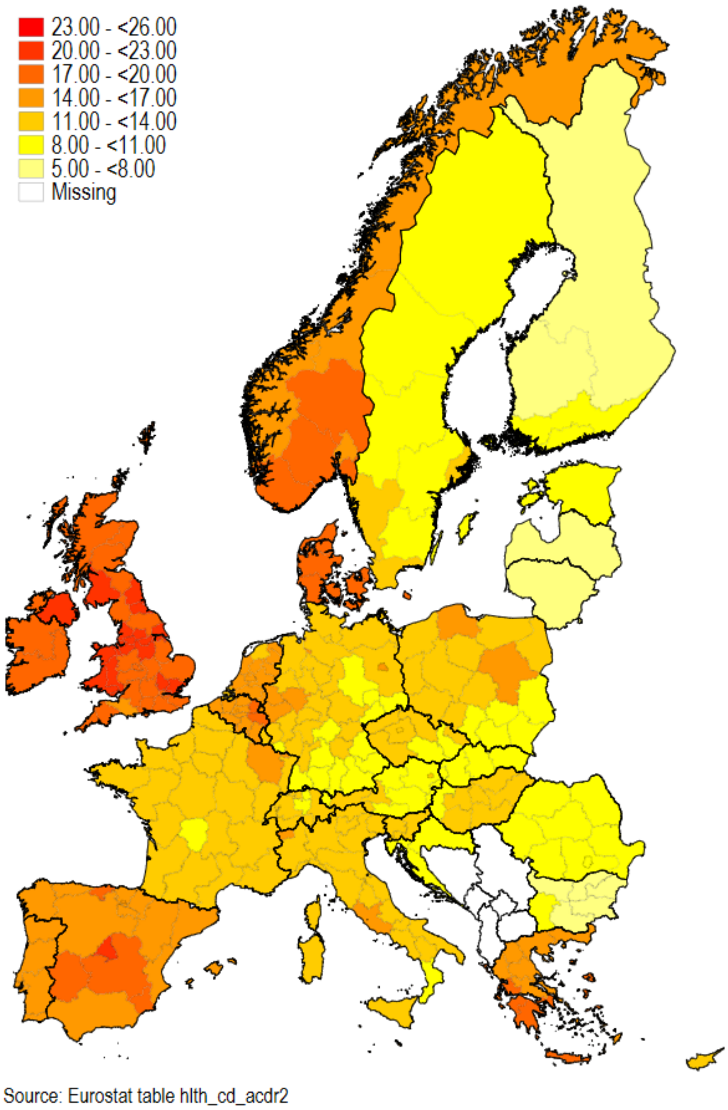
(c) Share of 65+ to hospital beds



(d) Share of 80+ to hospital beds

These figure show the share of age 65 and 80 plus population to doctors and hospital beds. A darker share indicates that there is a higher ratio of population to medical facilities, potentially indicating a stress on the system.
Note: Data for population from 2019. Data for doctors and hospital beds is from 2015, which is the most complete dataset on Eurostat. Germany (DE) provided information at NUTS 1 level only. This has been evenly split across NUTS2 levels. UK provided national level (NUTS 0) information only. NL provides national level (NUTS 0) information only for hospital beds. These were skipped.

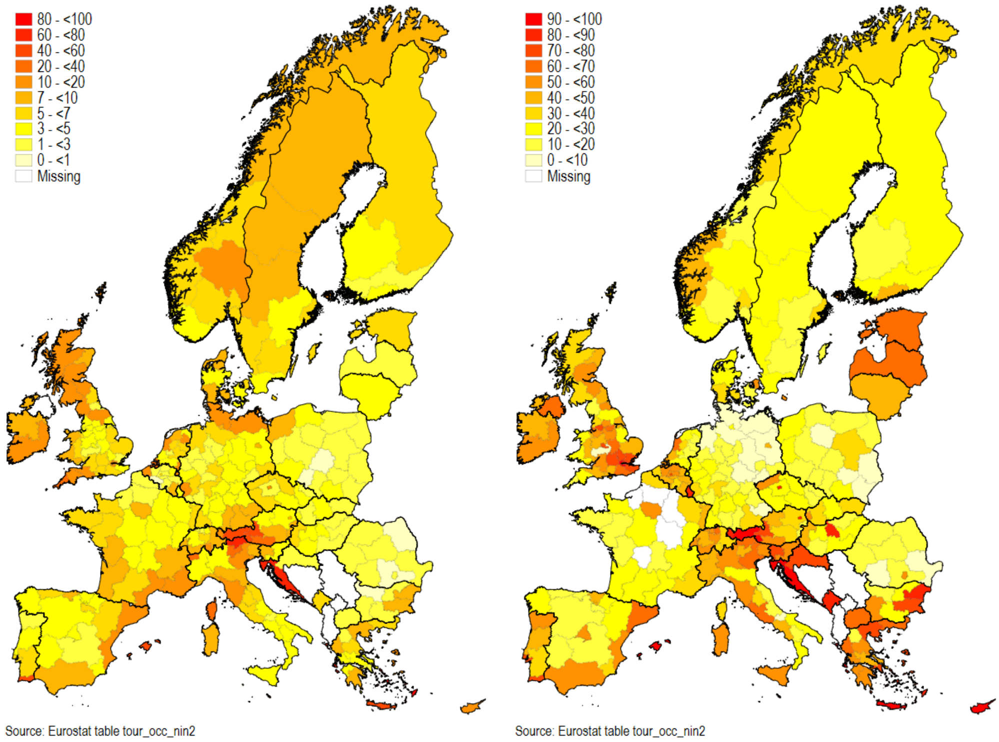
Fig. 12: Percentage share of lungs/respiratory-related death in total reported deaths (2016)



This map is intended to indicate regions where lungs or respiratory-related deaths are the highest amongst all reported deaths. These areas might suffer from poor air quality that is likely to increase the impact of COVID-19.

6 Tourism

Fig. 13: Tourism



(a) Tourists per capita (2018) (b) Percentage of non-national tourists (2018)

Figure (a) represents the total number of tourists per local population. The map shows that the alpine regions between Austria and Italy, and coastal regions see very high traffic in terms of tourism. This can reach as high as 80–90 tourists per person in some regions. Figure (b) shows the share of non-national tourists, either from other EU countries or non-EU countries. Again mountainous (especially alpine) and coastal regions see a very high share of tourists coming in.