Analysis of COVID-19 Data Representation in Spain

(Phase 1: Analysis of COVID-19 data representation in the major national newspaper, national health organization and social media)

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Course: Human Computer Interaction and Information Visualization

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1. INTRODUCTION

The **COVID-19 pandemic in Spain** is part of the pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus was first confirmed to have spread to Spain on 31 January 2020, when a German tourist tested positive for SARS-CoV-2 in La Gomera, Canary Islands. Post-hoc genetic analysis has shown that at least 15 strains of the virus had been imported, and community transmission began by mid-February. By 13 March, cases had been confirmed in all 50 provinces of the country.

A lockdown was imposed on 14 March 2020. On 29 March, it was announced that, beginning the following day, all non-essential workers were ordered to remain at home for the next 14 days. By late March, the Community of Madrid has recorded the most cases and deaths in the country. Medical professionals and those who live in retirement homes have experienced especially high infection rates. On 25 March, the official death toll in Spain surpassed that of mainland China. On 2 April, 950 people died of the virus in a 24-hour period—at the time, the most by any country in a single day. On 17 May, the daily death toll announced by the Spanish government fell below 100 for the first time, and 1 June was the first day without deaths by coronavirus. The state of alarm ended on 21 June. However, the number of cases increased again in July in a number of cities including Barcelona, Zaragoza and Madrid, which led to reimposition of some restrictions but no national lockdown.

In this report we take a look at the different charts and data representations provided by 3 major newspapers in Spain including El pais, El diario and Burgosconecta. Information, data and data representations provided by Spain Ministry of health and amount of effort they put on social media to raise public awareness about the virus and latest updates about the pandemic situation will be discussed. In addition, a scientific paper which provides data representation to compare the covid-19 with the Spanish flu in the last century will be covered.

2. National Newspapers2.1. EL PAIS

According to the Office of Justification of Dissemination (OJD), *El País* is the second most circulated daily newspaper in Spain as of December 2017. And it is the most read newspaper in Spanish online and one of the Madrid dailies considered to be a national newspaper of record for Spain in 2018.

This newspaper played a great role in informing people about updates and general information along with numerus details about COVID-19. Moreover, it provides beneficial information in science, health care, plus COVID-19 effect on citizenship and economy.

The main page to access information on COVID-19 information: Link

2.1.1 Data Representation 1

Figure 1 Accumulated cases since the beginning of the new normal.

Type of the data representation: Single line chart

Variables Considered in this data representation: y axis shows the total number of cases diagnosed with covid-19, and x axis shows the timeline which starts from July 1 (New Normal). New Normal refers to the time which rules and laws of the first state of alarm (curfew) which was held between march 14 and March 21 was removed. Although on y axis we only see monthly separation of time, if we hover our mouse cursor on the main orange line, we can see the exact number of patients who were diagnosed with covid-19 on each specific day.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health. Link

Link for daily updates of this data representation: Link

2.1.2 Data Representation 2

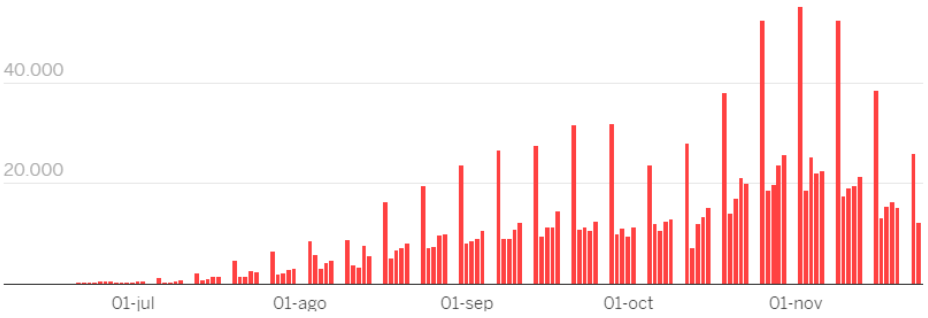

Figure 2 Evolution of confirmed positive cases as of July 4.

Type of the data representation: Bar chart

Variables Considered in this data representation: In this graph, each bar represents the daily average of the cases that occurred in the last 7 days. X axis shows the timeline and on y axis we can see the daily reported cases. And as we hover the mouse cursor on each bar we can see the exact number of reported cases.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health. Link

Link for daily updates of this data representation: Link

2.1.3 Data Representation 3

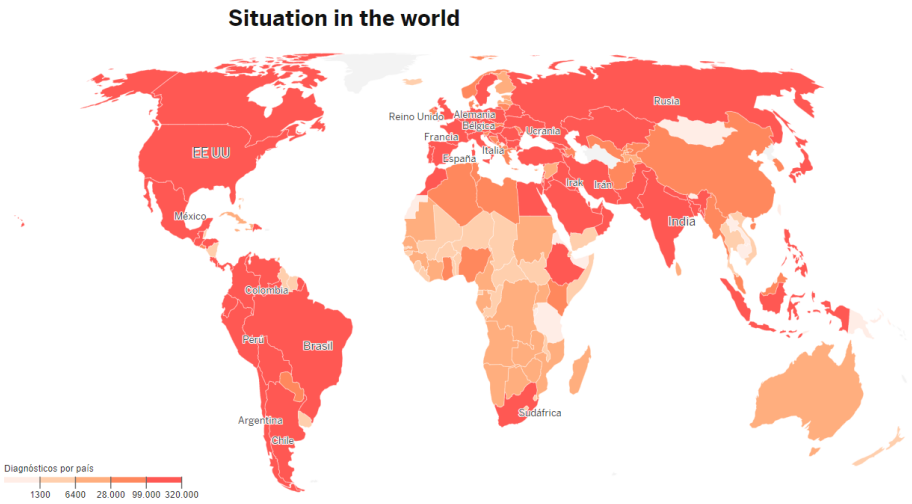

Figure 3 Situation in the World.

Type of the data representation: Choropleth map

Variables Considered in this data representation: This choropleth map shows the map of the world divided by each country and their situation with the number of diagnosed and dead people with covid-19. As it is shown in the legend as we go from light to dark colors the numbers grow higher and higher. Moreover, as we hover the mouse on each country we can see the exact updated number of people diagnosed with covid-19 and the number of dead caused by it.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health (Link), and John Hopkins University (Link).

Link for daily updates of this data representation: Link

2.1. EL DIAIRO

It was founded in 2012 and is published only in Spanish; it has been available since 18 September 2012. This is another local newspaper which provides various types of useful COVID-19 data representations.

The main page to access information on COVID-19 information: Link

2.2.1 Data Representation 1

In this chart the size of the square indicates the number of confirmed COVID-19 cases in each community in the last 14 days.

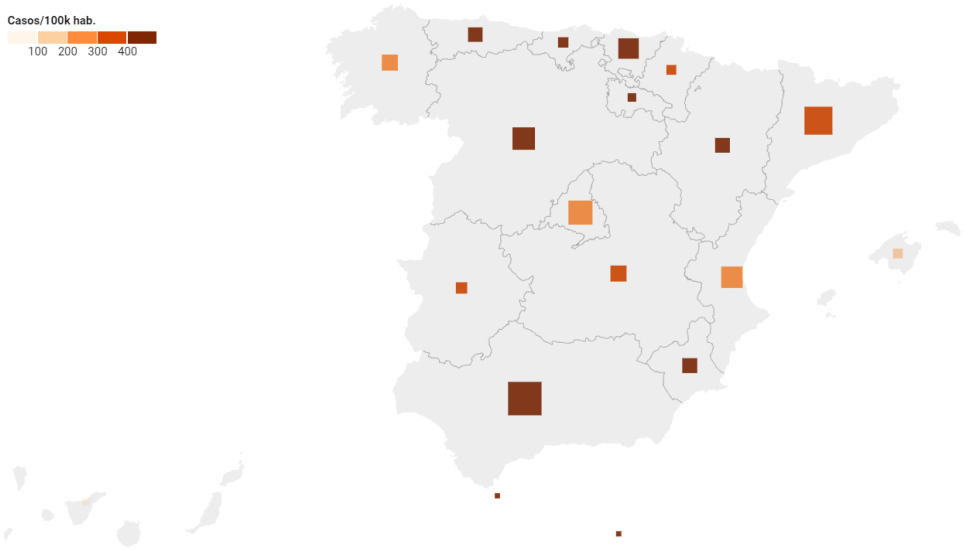

Figure 4 Number of confirmed cases in the last 14 days.

Type of the data representation: Encoding by Cartogram

Variables Considered in this data representation: This graph shows the map of Spain divided by each province and their situation with the number of diagnosed and dead people with covid-19. As it is shown in the legend as we go from light to dark colors the numbers grow higher and higher. Moreover, as we hover the mouse on each square, we can see the exact updated number of people diagnosed with covid-19 in the last 14 days, total number of confirmed cases and the number of dead caused by it in the last 14 days.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health. Link

Link for daily updates: Link

2.2.2 Data Representation 2

This chart depicts the evolution of cases, deaths, hospitalizations and those admitted to the ICU notified each day according to the notification date.

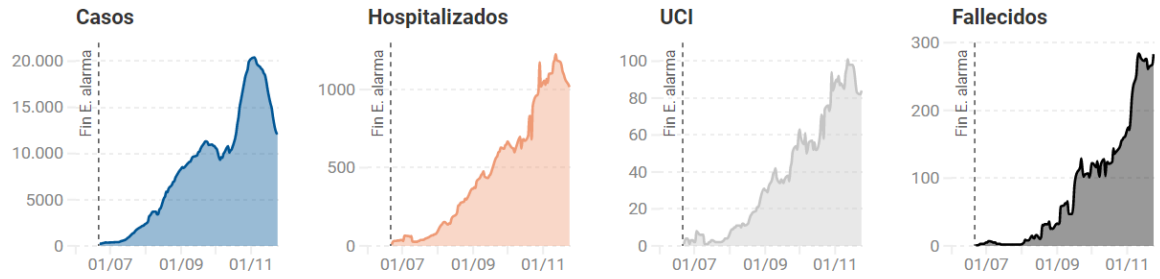

Figure 5 Weekly trend of confirmed cases, Hospitalized, ICU and Deceased.

Type of the data representation: Trellis line graph / Histogram

Variables Considered in this data representation: In this representation we can see number of confirmed cases, patients in hospital, patients in ICU and number of dead caused by covid-19, respectively on y axis. And x axis for all of the graphs is the timeline with 3 monthly separation points. Moreover, if we hover the mouse on each point on each line, we can see the specific correspondent number and date.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health. Link

Link for daily updates: Link

2.2.3 Data Representation 3

Evolución del número de casos nuevos en España. Los casos se muestran por fecha de diagnóstico.

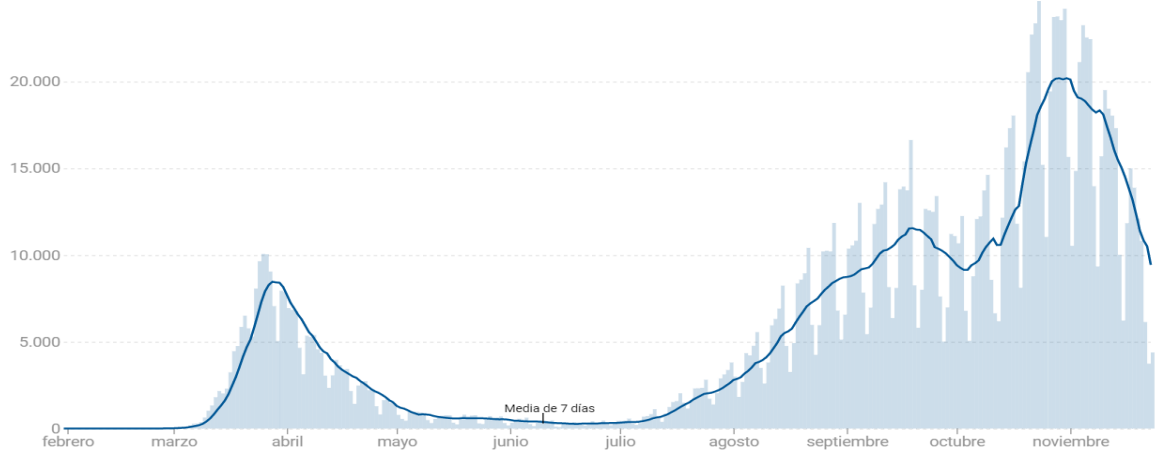

Figure 6 Evolution of the curve of new cases.

Type of the data representation: Histogram with 7 day moving average

Variables Considered in this data representation: In this graph we can see number of confirmed cases on y axis and the timeline on x axis. The special characteristic of this graph is its 7day moving average which clearly identifies the trend itself and its turnovers. Moreover, as we hover the mouse on each point more details can be seen.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health. Link

Link for daily updates: Link

2.2.4 Data Representation 4

To see how well controlled the pandemic is and to identify possible outbreaks, the following map shows the main variables to see the situation of the epidemic in each province: if the cases are increasing or decreasing, the incidence of cases per inhabitant in the last two weeks, the total number of cases and the incidence of the virus compared to its population.

These data are published by the Carlos III Health Institute (ISCIII) through the National Epidemiological Surveillance Network (RENAVE).

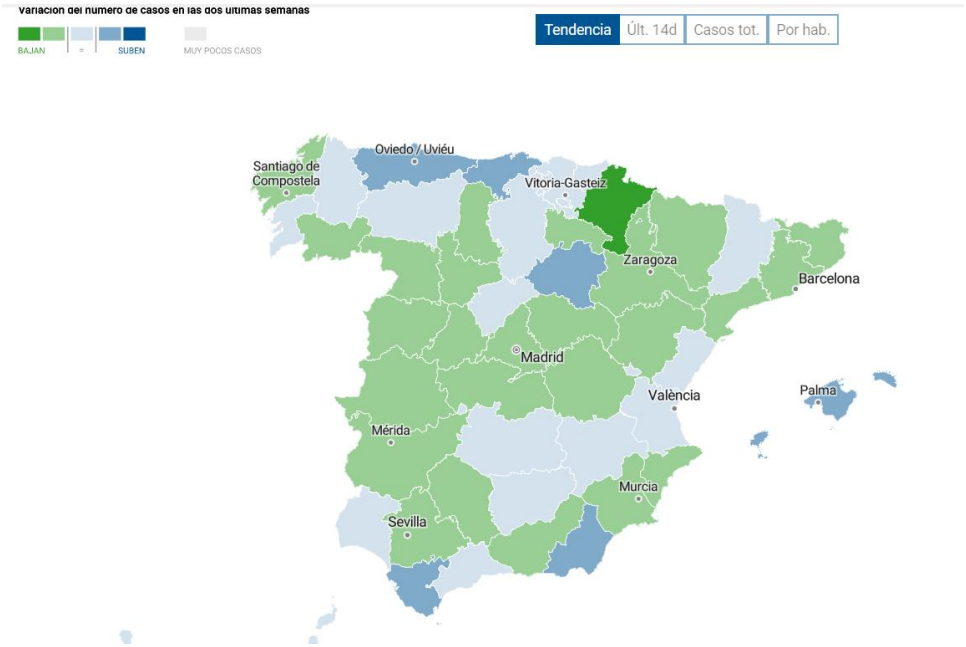

Figure 7 Trend of confirmed cases in the last week.

Type of the data representation: Choropleth map

Variables Considered in this data representation: this map beautifully depicts the trend of confirmed cases in Spain divided by each region. As we go from Green to Blue, it means that the trend is transforming from a downward trend to an upward one. In other words, the map shows that the number of confirmed cases in each region is decreasing or decreasing. Moreover, the weekly number of confirmed cases plus the number of cases per 100,000 inhabitants is shown if we hover the mouse on each region.

Dataset used for this data representation: Carlos III Institute

Link for weekly updates of this data representation: Link

2.3. BurgosConecta

2.3.1 Data Representation 1

A scenario in which you must not lose sight of some indicators such as the percentage of occupation of beds and ICU, which in some cases reaches 40% or more only with COVID patients.

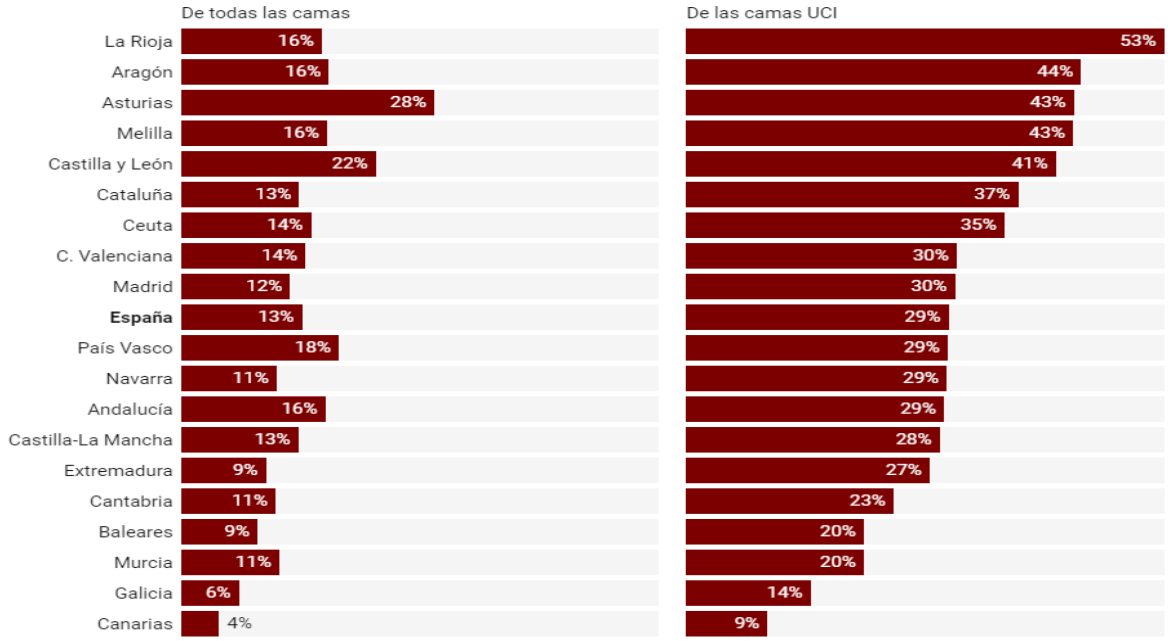

Figure 8 Percentage of beds occupied by COVID patients.

Type of the data representation: Horizontal Bar Graph

Variables Considered in this data representation: This graph clearly shows the percentage of beds occupied by covid-19 patients in Spanish hospitals divided by each region plus the Spain itself as a whole country. The names of the regions are included in rows, first column is the percentage of total beds occupied by covid-19 patients and second column indicates the percentage of ICU beds occupied by covid-19 patients.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health. Link

Link for daily updates: Link

2.3.2 Data Representation 2

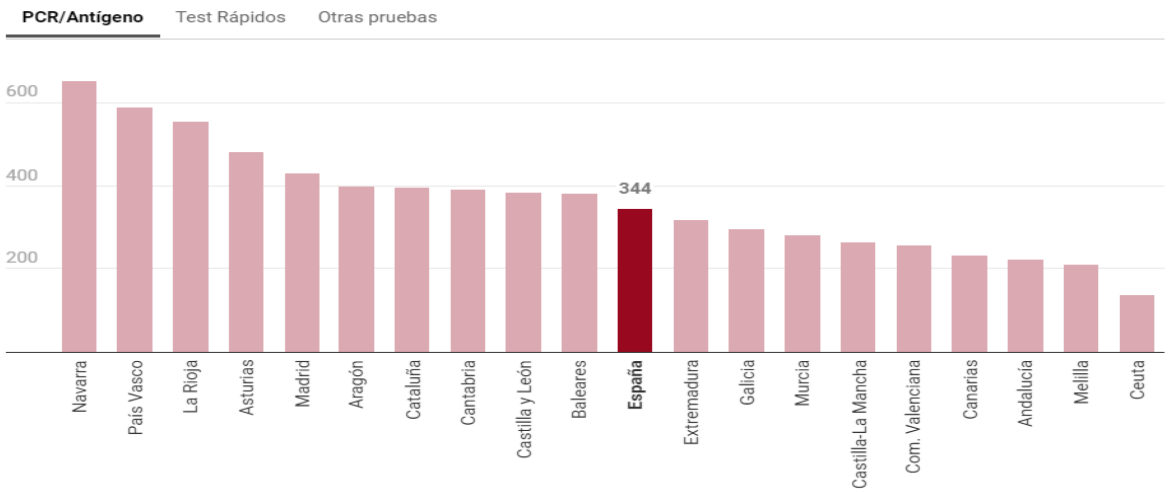

Figure 9 Number of tests per 1000 inhabitants.

Type of the data representation: Bar Graph

Variables Considered in this data representation: In y axis we have tests (PCR/Antigen) per 1,000 inhabitants and in x axis the names of regions plus the Spain itself is shown.

Dataset used for this data representation: Data set gathered by ministry of health of each province to the Spain ministry of health.

Link for daily updates: Link

2.3.3 Data Representation 3

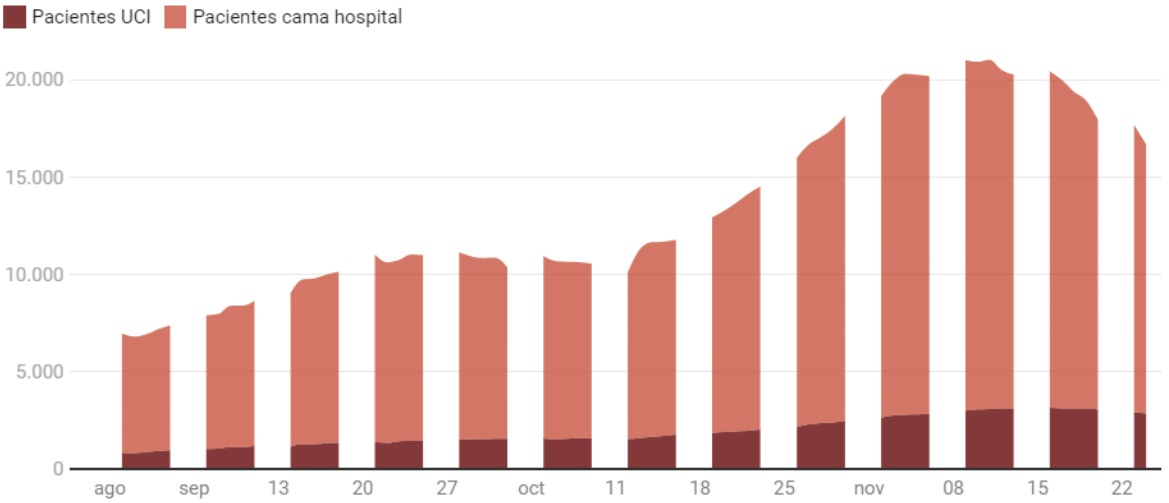

Figure 10 Patients admitted with COVID-19 in Spanish Hospitals.

Type of the data representation: Bar chart

Variables Considered in this data representation: On the y axis the number of beds in the hospital is depicted and x axis is the timeline. Light colored side of the chart indicates the total number of beds and dark colored side refers to ICU beds occupied by covid-19 patients in hospitals. In addition, as we hover the mouse on each bar we can see exact numbers.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health. Link

2.3.4 Data Representation 4

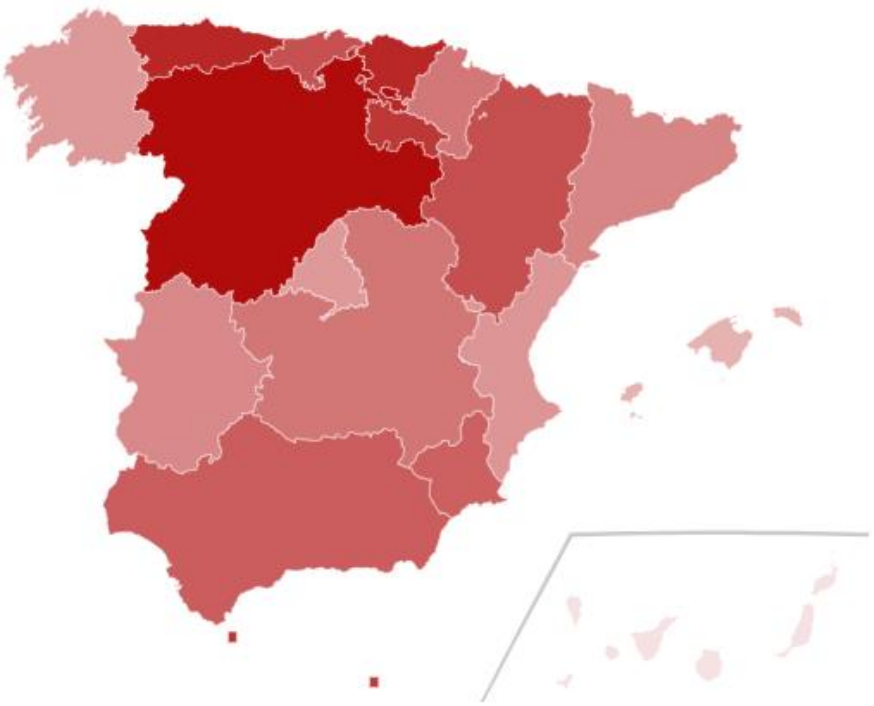

Figure 11 Situation of infected in the last 14 days.

Type of the data representation: Choropleth map

Variables Considered in this data representation: This graph shows the map of Spain divided by each province and their situation with the number of diagnosed and dead people with covid-19. As we go from light to dark colors the numbers grow higher and higher. Moreover, as we hover the mouse on each province, we can see the exact updated numbers.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health. Link

2.3.5 Data Representation 5

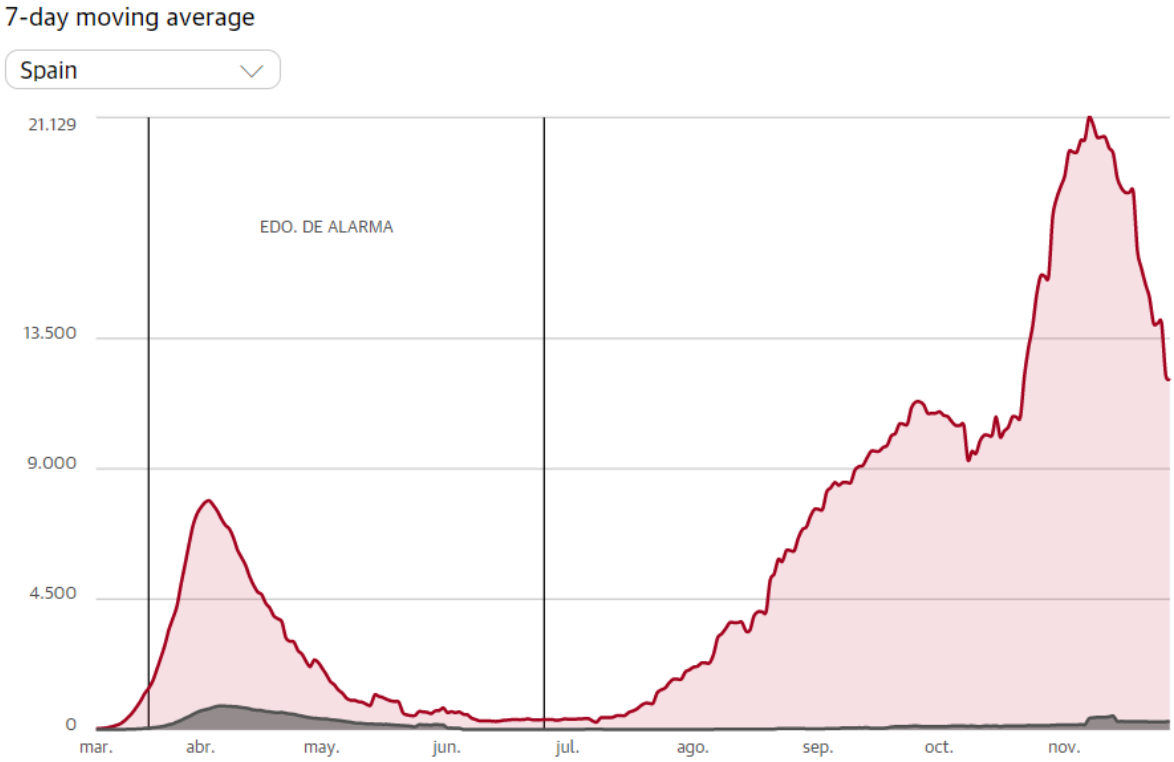

Figure 12 7-day moving average on number of infected and death.

Type of the data representation: 7 day moving average

Variables Considered in this data representation: On this chart, y axis is the number of new cases and x axis is the timeline. As we hover the mouse on each point on the line, we can see average new cases and average new deaths. The line itself is a 7day moving average which perfectly shows the upward trend and turnover points in the timeline.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health. Link

2.3.6 Data Representation 6

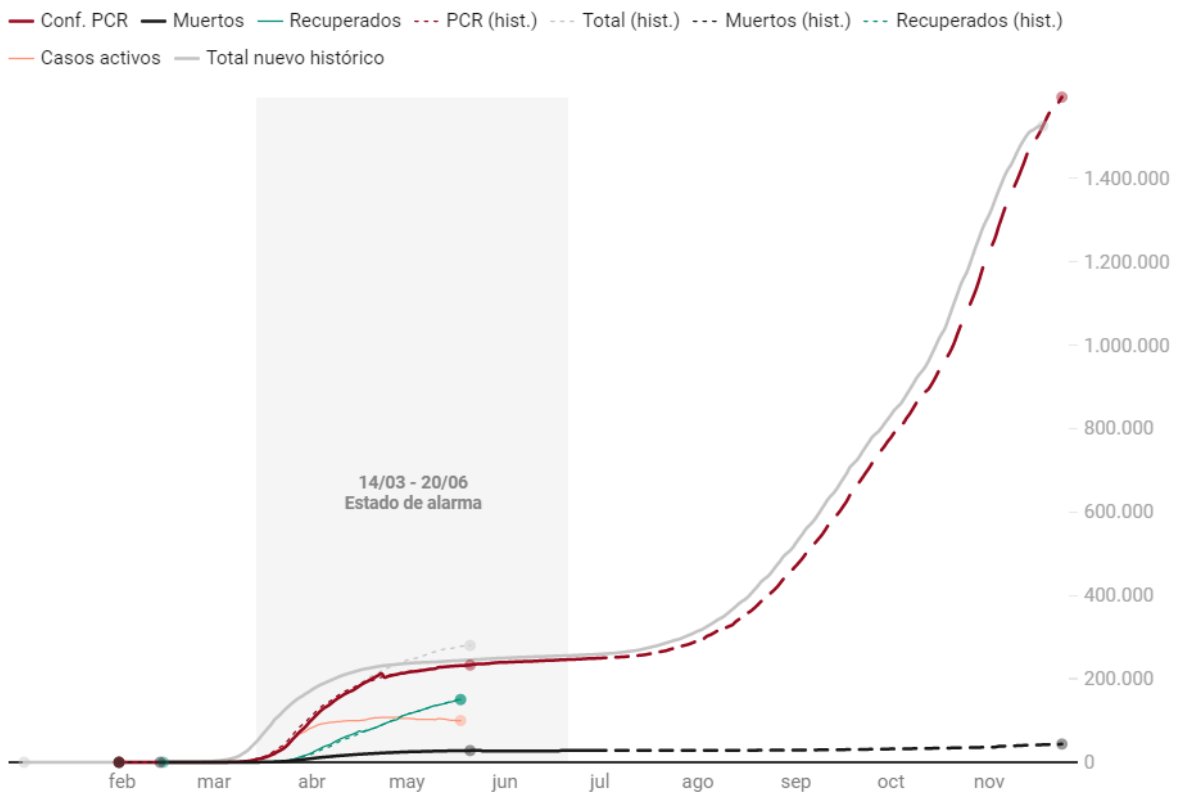

Figure 13 pandemic timeline.

Type of the data representation: Multiple line chart

Variables Considered in this data representation: Here y axis is the total number of infected and x axis is the timeline which start from February (The beginning of covid-19 in Spain). The grey line is the total number, red line is the number of confirmed positive PCR test and the black line is the number of deaths. Moreover, as we hover the mouse on each point more details can be shown.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health (Link) and Carlos III Institute (Link).

2.3.7 Data Representation 7

The coronavirus has generated different curves in the countries it has reached. One of the most effective methods to analyse the behaviour of the covid-19, according to experts, is through the comparison of daily deaths. Thus, although each country has a different way of counting them, it is a more precise data than that of confirmed cases, which does not reflect the real number of infections (because its detection is not precise). This graph shows the average of the last seven days of reported daily deaths (this average helps to visualize the trend because some cases are reported late).

Figure 14 Comparison with other countries.

Type of the data representation: Multiple line chart

Variables Considered in this data representation: The x axis of this chart is the timeline which starts from the days after the first 10 deaths from covid-19, and y axis shows the average number of deaths. Each line represents a country and it is the 7day moving average of the number of deaths in each country. As we hover the mouse on each point, we can see the exact date and the number of deaths.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health (Link), and John Hopkins University (Link).

2.3.8 Data Representation 8

The death rate per million inhabitants makes the data comparable regardless of the country's population. Spain remains near the top of this world list.

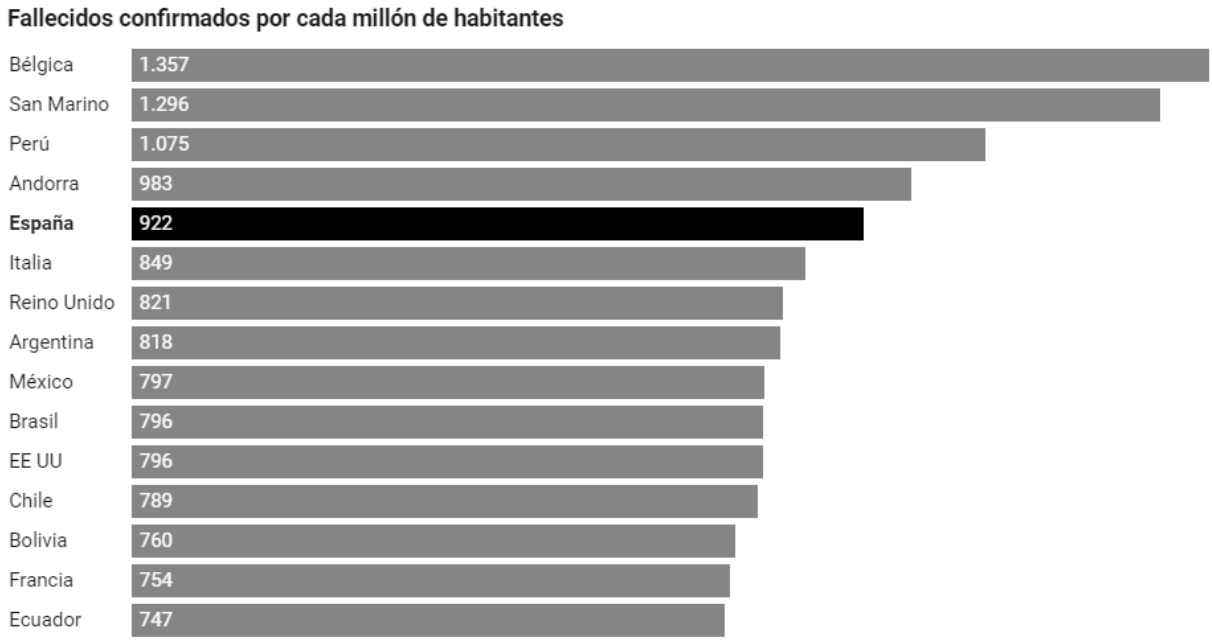

Figure 15 Comparison with other countries.

Type of the data representation: Horizontal Bar Graph

Variables Considered in this data representation: This graph compares the death rate per million inhabitants in Spain with other countries, so that the data are more suitable for comparison. The numbers are as of 24/11.

Dataset used for this data representation: Dat set used to create this chart is driven from Spain ministry of health (Link), and John Hopkins University (Link).

2.5. Press Article

Title: The coronavirus epidemic has already caused five times more deaths than the 2019 flu epidemic.

Publisher: *El pais Newspaper*

Link to the press article:https://elpais.com/sociedad/2020/04/09/actualidad/1586435286_092135.html

Data Representation 1

The normal thing for a month of March is that there are 30,000 deaths in Spain. But the number of deaths registered this year is around 45,000. 48% more, according to data from the Mortality Monitoring System (MoMo) of the Carlos III Health Institute. That is the excess of deaths registered so far during the coronavirus crisis. The graph shows the expected and observed deaths since 2018, which the center has made public for the first time this Tuesday in a new tool. The black line represents the expected deaths, according to the MoMo statistical model, for all causes. The red line shows the deaths actually observed and reported by civil registries. In the last two years there had not been a single day with 1,600 deaths, but since March that figure has been exceeded at least 15 times.

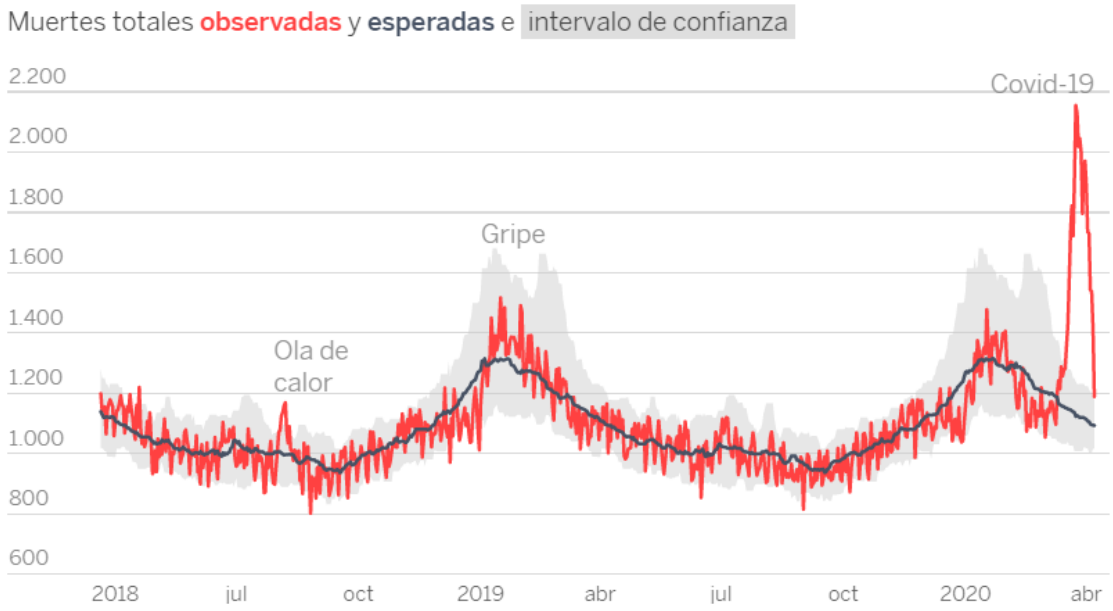

Figure 16 observed, expected and confidence interval.

Type of the data representation: Multiple line chart

Variables Considered in this data representation: As mentioned above the black line represents the expected deaths, according to the MoMo statistical model, for all causes. The red line shows the deaths actually observed and reported by civil registries. The x axis is the timeline starting from 2018.

Dataset used for this data representation: Dat set used to create this chart is driven from Carlos III Institute (Link).

Link for daily updates: Link

Data Representation 2

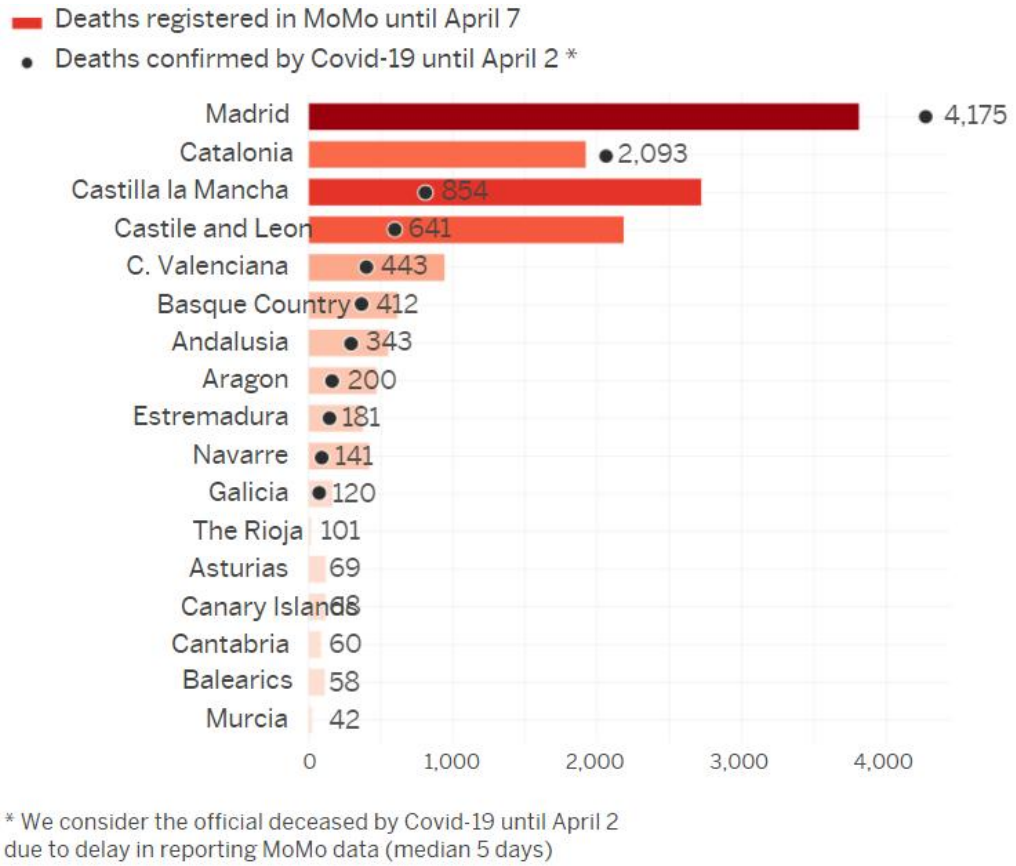

Figure 17 registered and confirmed number of deaths.

Type of the data representation: Horizontal Bar Chart

Variables Considered in this data representation: The graph below compares the excess deaths observed by MoMo in each community and the confirmed deaths of people with Covid. There are notable differences: in Castilla-La Mancha or Castilla y León the excess of deaths is much higher than

the confirmed Covid deaths, while in Madrid or Catalonia it happens the other way around. But these differences may be reflecting temporary mismatches in civil records.

Dataset used for this data representation: Dat set used to create this chart is driven from Carlos III Institute (Link).

Link for daily updates: Link

Data Representation 3

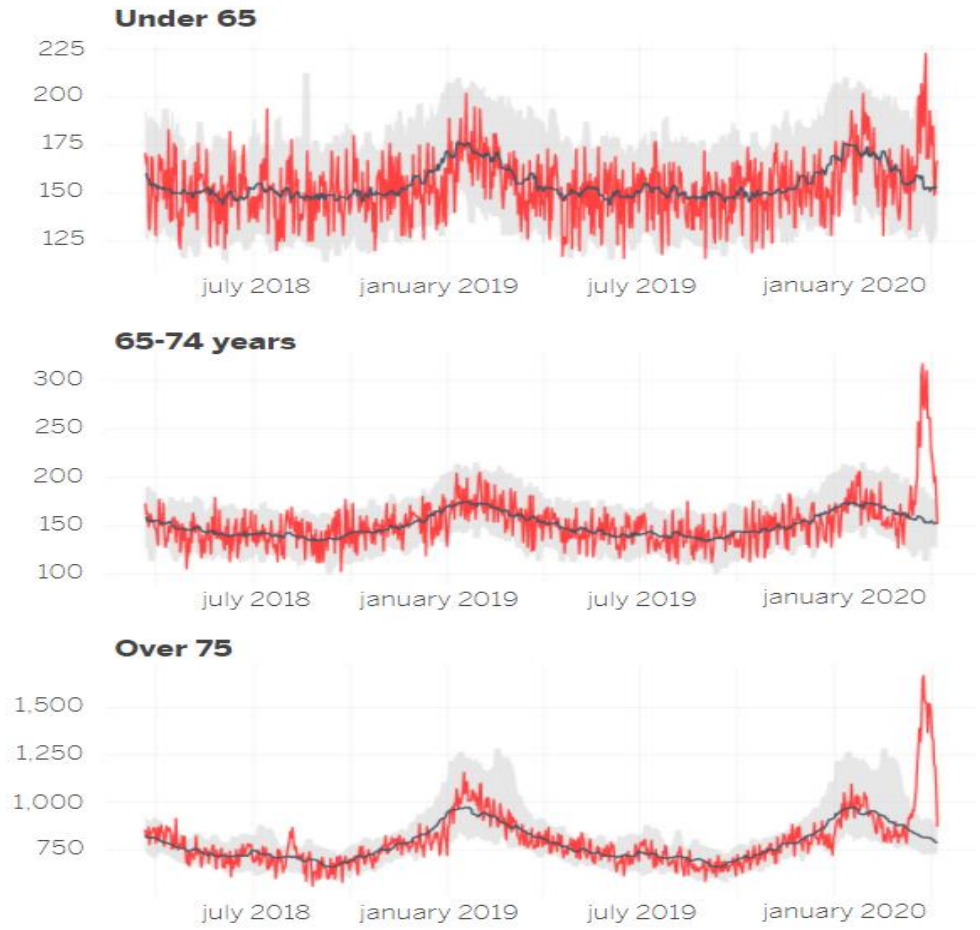

Figure 18 Excesses deaths by age.

Type of the data representation: Multiple Line chart

Variables Considered in this data representation: It is the same data representation as data representation 1, but divided between different age categories.

Dataset used for this data representation: Dat set used to create this chart is driven from Carlos III Institute (Link).

Link for daily updates: Link

Data Representation 4

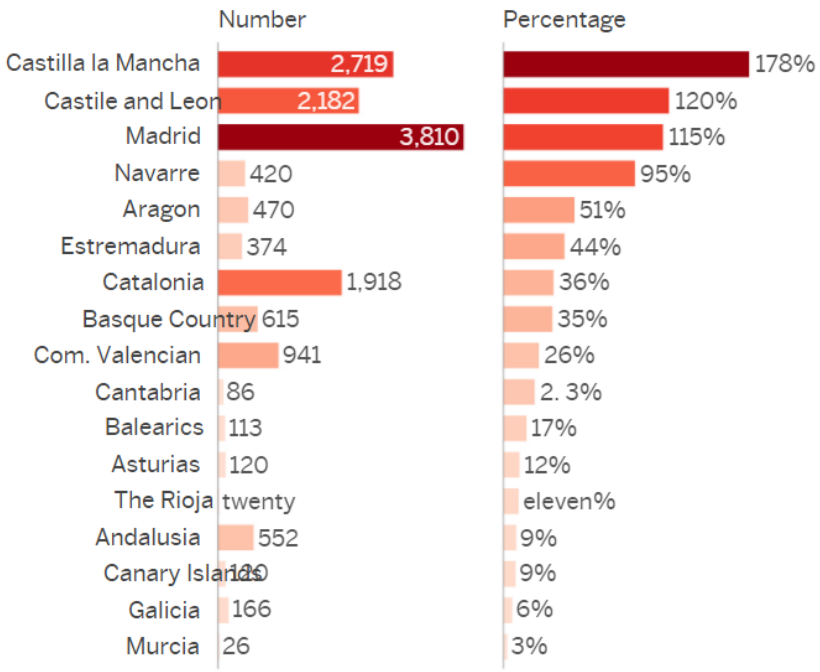

Figure 19 Excesses of deaths in each autonomy since March 10.

Type of the data representation: Horizontal Bar chart

Variables Considered in this data representation: The figure above shows the excess of deaths registered in each Autonomous Community. Madrid is the one that registers the highest figure (more than 3,000 deaths in excess), although the worst percentage is that of Castilla-La Mancha (the registered deaths are double those expected).

Dataset used for this data representation: Dat set used to create this chart is driven from Carlos III Institute (Link).

Link for daily updates: Link

2.5. Points of strength and weakness

El pais:

It provides useful information with data sets gathered from Spain ministry of health and John Hopkins University. The single line chart along with the bar chart clearly depicts the upward trend in confirmed cases of covid-19 in Spain. In addition, they provide specific details while hovering the mouse cursor on top of each point. The bar chart also provides weekly comparison of confirmed cases while showing the upward trend. The choropleth graph gives a great amount of information at a glance, and almost in a second we can notice in which parts of the world the coronavirus has spread more.

However, what gives this newspaper advantage over other sources is its information on science, health, citizenship and economy. Moreover, it offers question-and-answer section where common questions about each topic has been answered and ready for the readers.

Links to each section of the newspaper is listed below:

Main Page

What Science Knows

Health

How my life changes

The economic impact

Question and answer

Although it provides beneficial and general information on different aspects and effects of covid-19, it lacks some information which is not mentioned but they are still as important as the ones which are mentioned, like: number total number of patients in hospitals, and its comparison with the number of patients diagnosed with covid-19 in hospitals, or overall situation of Spanish hospitals divided by region.

***El Diario*:**

This newspaper focuses more on trends of confirmed cases and whether the situation is getting worse or better in each region. Moreover, it covers the situation in hospitals of Spain by providing representations on covid-19 patients registered in hospitals and ICU patients. Both cases are not much covered by other newspapers, so we can say that on trends and conditions of hospital, this newspaper is doing a better job than others.

However, it lacks some critical information like, how to deal with the virus or how it effects a citizen's life. Providing guidance and information on how to cope with life during the pandemic is one of the key rolls of a media, and missing these types of information can be a serious disadvantage.

BurgosConecta:

It does a great job of explaining the hospitals situation divided by each region during the time of pandemic like the previous newspaper. However, Burgosconecta's data representations to compare the situation of the pandemic in Spain with other countries gives the readers insightful information and knowledge.

On the other hand, like the previous newspaper it lacks the guidance and information needed for people on how they can cope with the situation and what the can/should/must do during the pandemic.

3. National Health Authority

3.1. Description

The Ministry of Health (MISAN) is the department of the Government of Spain responsible for proposing and executing the government policy on health, planning and providing healthcare as well as the exercise of the powers of the General State Administration to assure citizens the right to health protection. The Ministry is headquartered in the Paseo del Prado in Madrid.

According to Eurostat, Spain spends 6.2% of GDP on health, approximately $83 billion (€70 billion).

The Spain ministry of health plays a great role in providing the data set, presenting the data, analyzing data, publishing daily/weekly/monthly reports, raising public awareness and guiding citizens through the pandemic situation. Almost all the newspapers in Spain and outside of Spain rely on the information provided by ministry of health to create new representations or report the data in their online web pages or physical newspapers.

Their efforts on social media will be discussed later on in this report.

3.2. Data Representation 1

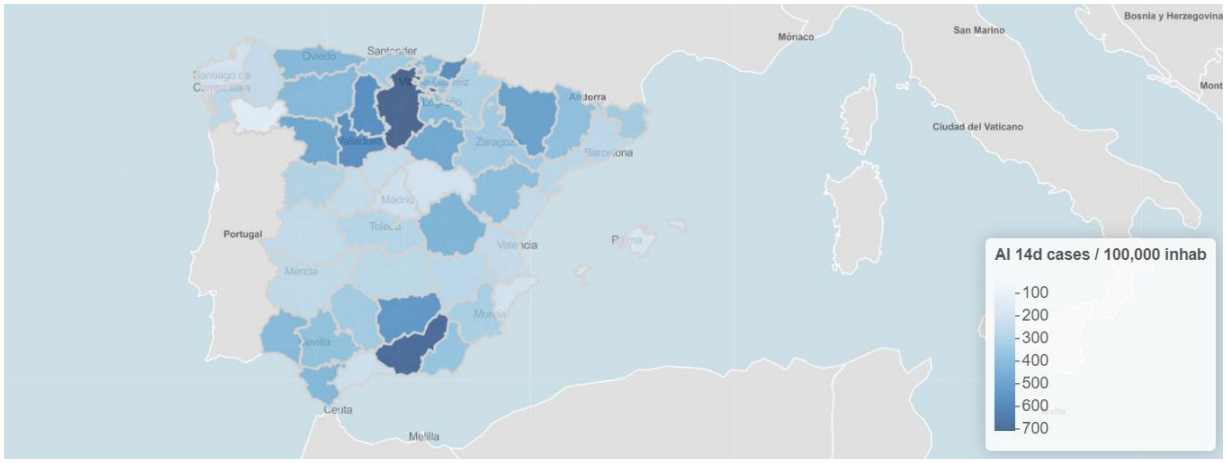

Figure 20 official map.

Type of the data representation: Choropleth map

Variables Considered in this data representation: This graph shows the map of Spain divided by each province and their situation with the number of diagnosed and dead people with covid-19 in the last 14 days with per 100,000 inhabitants. As shown in the legend as we go from light to dark colors the numbers grow higher and higher. Moreover, as we hover the mouse on each province, we can see the exact updated numbers.

Link for daily updates: Link

3.2. Data Representation 2

The information in this graph clearly depicts the differences between first and second wave of covid-19 in Spain and it perfectly compares them. In addition, the website provides the same representation for each province individually which can be beneficial to local people.

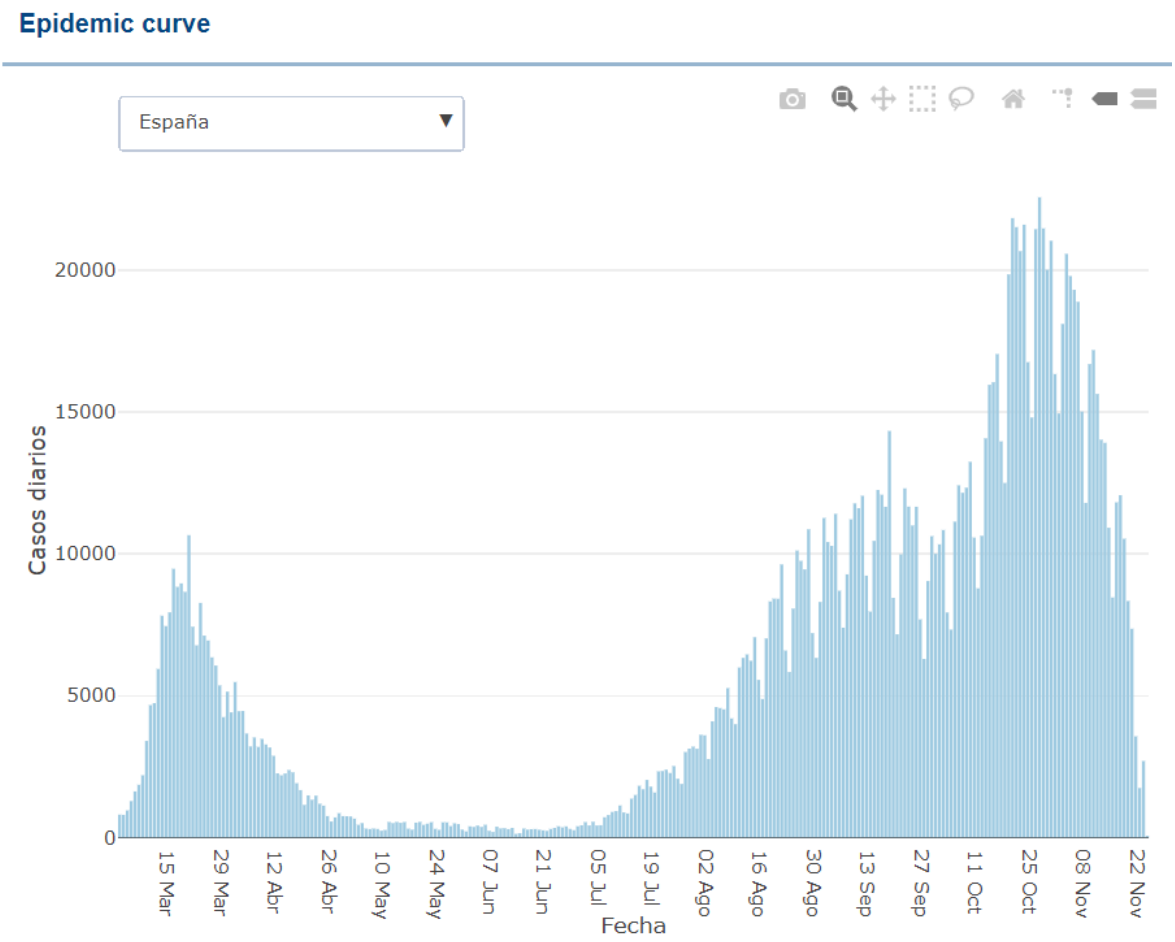

Figure 21 epidemic curve (bar graph).

Type of the data representation: Bar graph

Variables Considered in this data representation: This graph shows the number of daily confirmed cases on the y axis and the timeline on x axis. A we hover the mouse we can see the exact date and number of newly confirmed cases in each day.

Link for daily updates: Link

3.2. Data Representation 3

The instantaneous basic reproduction number (Rt) is the average number of secondary cases that each infected subject can infect in a time stage (t). It provides an overall measure of the potential for transmission of an infection within a population, and it is dependent not only on the transmission coefficient but also on the average duration of infectiousness. The higher the value of *Rt*, then the higher vaccine coverage must be to eliminate a disease.

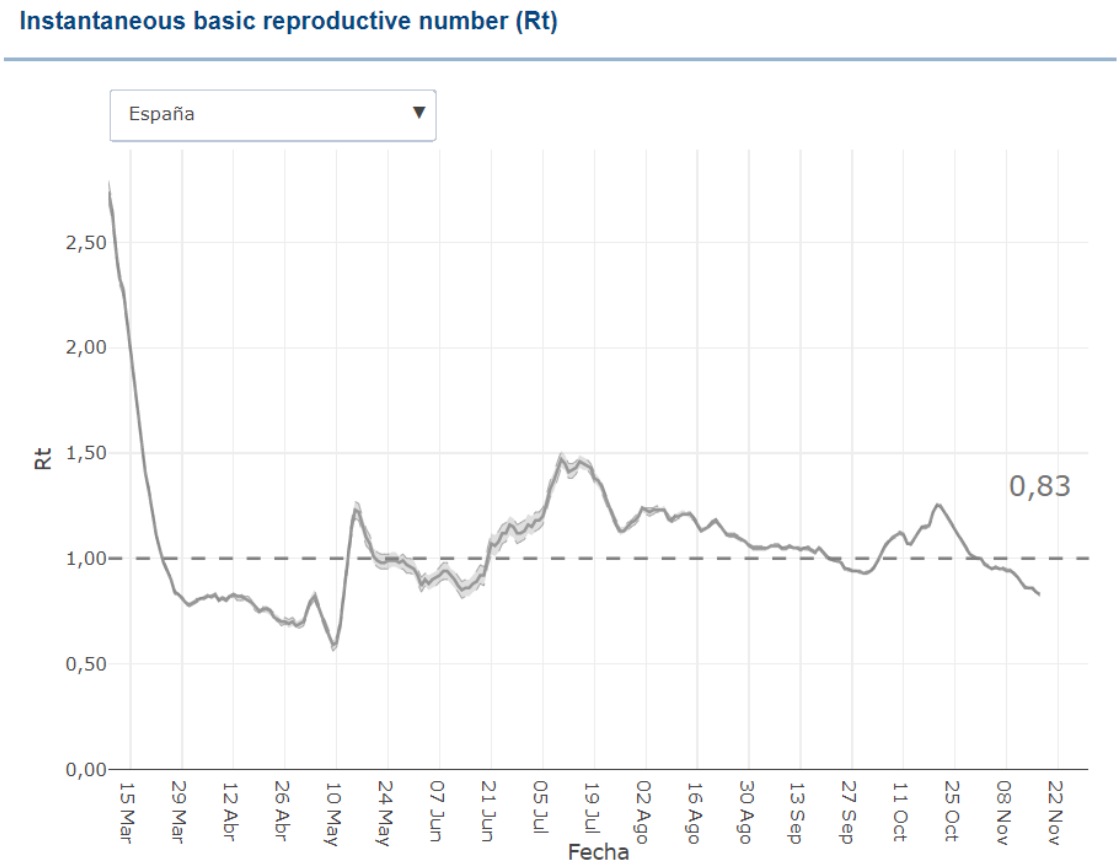

Figure 22 instantaneous basic reproductive number.

Type of the data representation: line chart

Variables Considered in this data representation: This graph shows the Rt index on y axis which is explained above, and x axis is the timeline. As we hover the mouse on each point, we can see the exact Rt index in each certain date.

Link for daily updates: Link

3.3. Points of strength and weakness

The data representation provided by ministry of health is accounted as the most reliable in Spain. Besides, it provides 3 interesting data representations including a chart on basic reproductive rate which is not covered by most of the newspapers, although it gives the readers useful statistical information on covid-19 and infectious power of it.

Besides data representations and statistical information, it provides great information on social media on the website to raise public awareness and it plays a great role in guidance of citizens by providing necessary guides and spreading positive thoughts.

In general, we can confidently say that this is the most reliable, accurate and beneficial resource for the people of Spain to go to when it comes to covid-19 information.

4. Scientific Literature

4.1. Paper1

Spatial-temporal excess mortality patterns of the 1918–1919 influenza pandemic in Spain by Gerardo Chowell1,2*, Anton Erkoreka3, Cécile Viboud1 and Beatriz Echeverri-Dávila4

This scientific paper analyses the spatial-temporal mortality patterns of the 1918 influenza pandemic in Spain, which is much like covid-19 pandemic is one of the countries of Europe that experienced the highest mortality burden.

It analysed monthly death rates from respiratory diseases and all-causes across 49 provinces of Spain, including the Canary and Balearic Islands, during the period January-1915 to June-1919. It estimated the influenza-related excess death rates and risk of death relative to baseline mortality by pandemic wave and province. then it explored the association between pandemic excess mortality rates and health and socio-demographic factors, which included population size and age structure, population density, infant mortality rates, baseline death rates, and urbanization.

The analysis of this scientific paper revealed high geographic heterogeneity in pandemic mortality impact. It identified 3 pandemic waves of varying timing and intensity covering the period from Jan-1918 to Jun-1919, with the highest pandemic-related excess mortality rates occurring during the months of October-November 1918 across all Spanish provinces. Cumulative excess mortality rates followed a south–north gradient after controlling for demographic factors, with the North experiencing highest excess mortality rates. A model that included latitude, population density, and the proportion of children living in provinces explained about 40% of the geographic variability in cumulative excess death rates during 1918–19, but different factors explained mortality variation in each wave.

Link to source: https://link.springer.com/article/10.1186/1471-2334-14-371

4.2. Data Representation 1

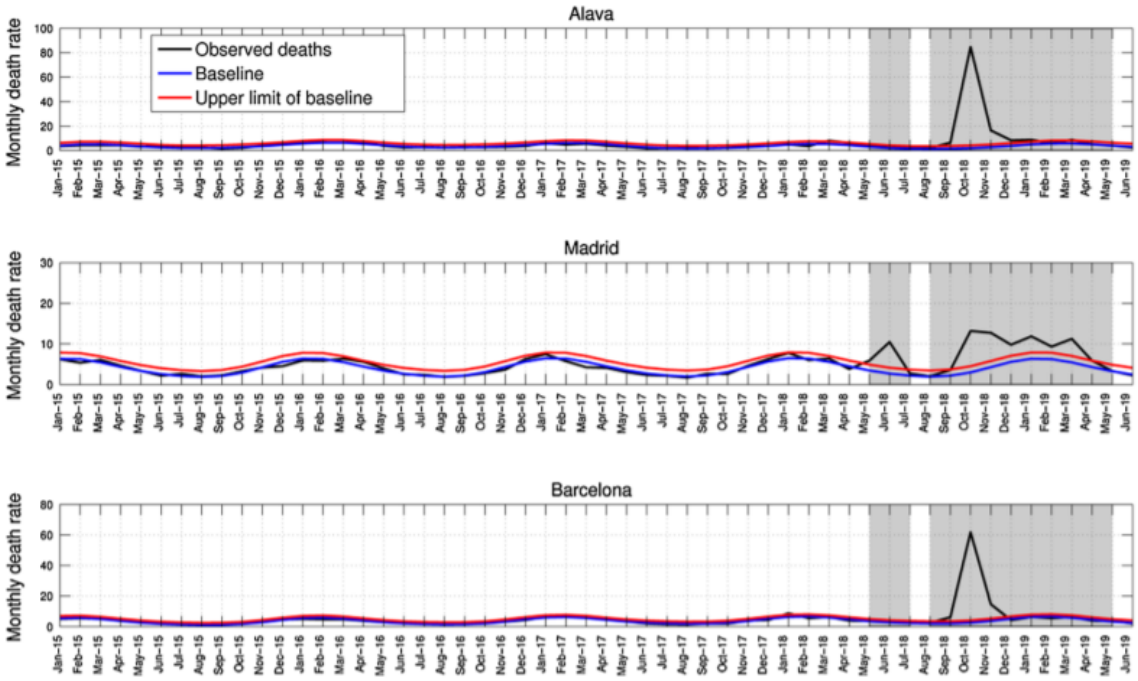

Figure 23 Monthly respiratory deaths per 10,000 people in three representative provinces of Spain, Jan-1915 to June-1919.

Type of the data representation: Multiple line charts

Variables Considered in this data representation: The black curve is the monthly number of respiratory deaths. Shaded areas highlight time periods of high mortality associated with the 1918–1919 pandemic in Spain. The Serfling seasonal regression model baseline (blue curve) and corresponding upper limit of the 95% confidence interval of the baseline (red curve) are also shown. Excess deaths are above the upper limit of the baseline mortality curve calibrated using mortality levels prior to the 1918 influenza pandemic.

4.3. Data Representation 2

Same type of representation as above represented for each province individually.

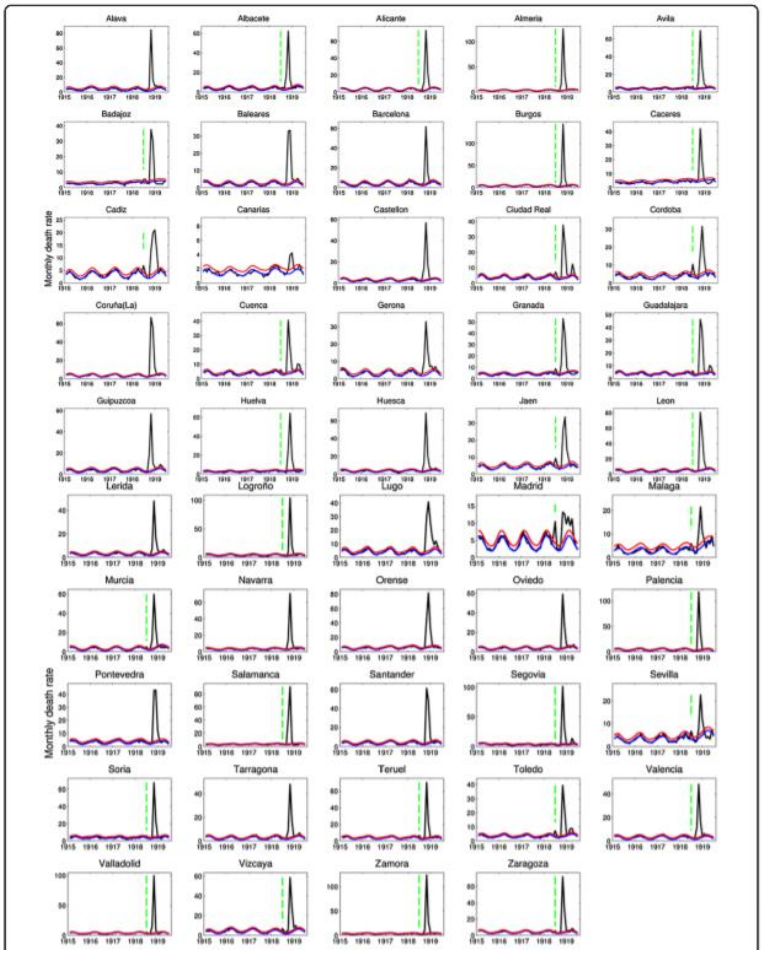

Figure 24 Monthly respiratory deaths per 10,000 people in three representative provinces of Spain, Jan-1915 to June-1919.

Type of the data representation: Multiple line charts

Variables Considered in this data representation: The black curve is the monthly number of respiratory deaths. Vertical green dashed lines indicate the presence of summer mortality waves whenever respiratory mortality rates exceeded the seasonal mortality baseline in any spring-summer month. The Serfling seasonal regression model baseline (blue curve) and corresponding upper limit of the 95% confidence interval of the baseline (red curve) are also shown. Excess deaths are above the upper limit of the baseline mortality curve calibrated using mortality levels prior to the 1918 influenza pandemic. Individual figures display different scales in the Y-axis.

4.4. Data Representation 3

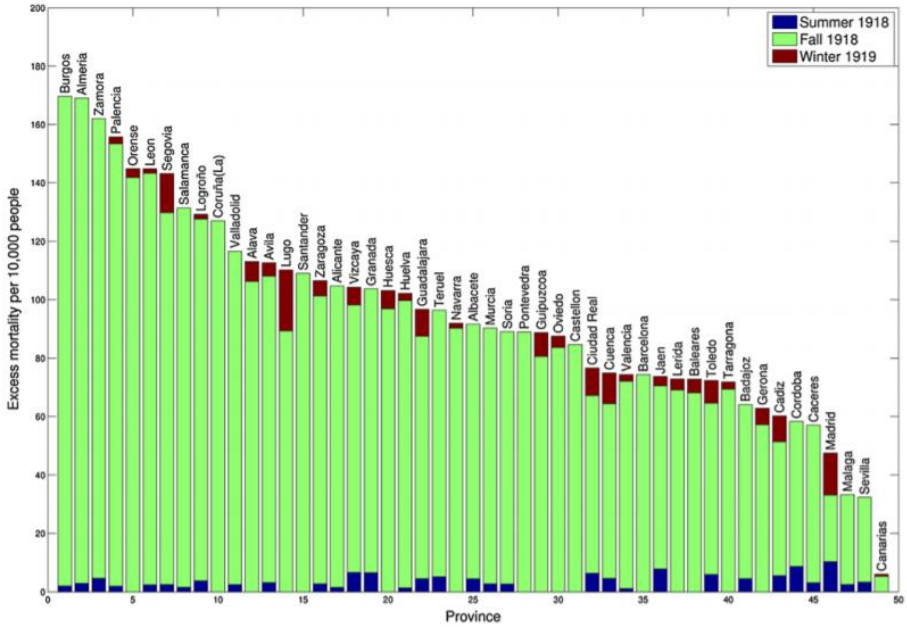

Figure 25 Excess respiratory mortality rates per 10,000 across 49 provinces of Spain.

Type of the data representation: Stacked Bar Graph

Variables Considered in this data representation: Results are shown for three pandemic periods (May-July 1918, August 1918-December 1918, and January 1919-April 1919) and sorted from high to low excess death rates. Excess deaths are above the upper limit of the baseline mortality curve calibrated using respiratory monthly mortality levels prior to the 1918 influenza pandemic.

4.5. Data Representation 4

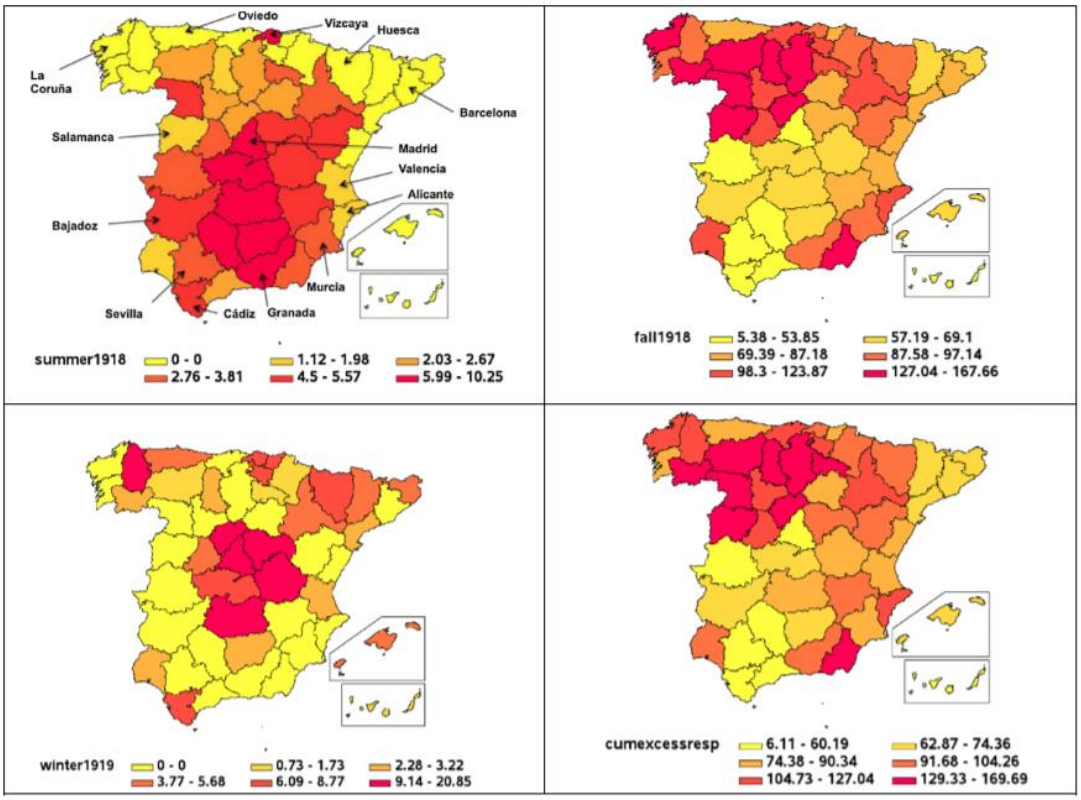

Figure 26 4 Maps of excess respiratory deaths rates per 10,000 across provinces of Spain.

Type of the data representation: Choropleth map

Variables Considered in this data representation: Maps are shown for three pandemic periods corresponding to spring (May 1918-July 1918), fall (August 1918-December 1918), and winter (January 1919-April 1919) pandemic waves and the cumulative excess respiratory death rate associated with the 1918–1919 influenza pandemic.

4.2. Points of strength and weaknesses

The researchers of this scientific paper managed to achieve interesting results and they represented their results as clear as possible. Excesses in mortality rate in the first chart, comparison between different waves of the pandemic in the third representation and high geographic heterogeneity in pandemic mortality impact in the last chart are as clear as it can be.

However, to some extent the used method in this paper and the statistics of the represented data relies on approximated numbers which is understandable since the pandemic occurred a century ago and because of lack of appropriate documentation and official tests at that time.

5. Social Media

5.1. Resource 1 – Spain Ministry of Health

As discussed before The Ministry of health is the most complete and reliable source of information and it plays a great role in guiding the people in the time of pandemic.

As they covered the statistics and data representations in their website and since these representations are commonly referenced by most newspapers, in their social media they keep it simple and they mostly used tables and simple columns to report the new updates about covid-19. Instead, in the social media their focus was mostly on educating people on what they should do and what to avoid during the time of pandemic and guiding them through the difficult situation while spreading positive thoughts and lifting the spirits, which is the most important role in the time of crisis.

Because of the importance of public education on the virus and its effect on normal life of people, the social media channels of Ministry of health are chosen to mostly focus on these subjects as it is the most easily accessible network by people, increasing amount of time spent on a daily basis on social media and information can be quickly transformed to people.

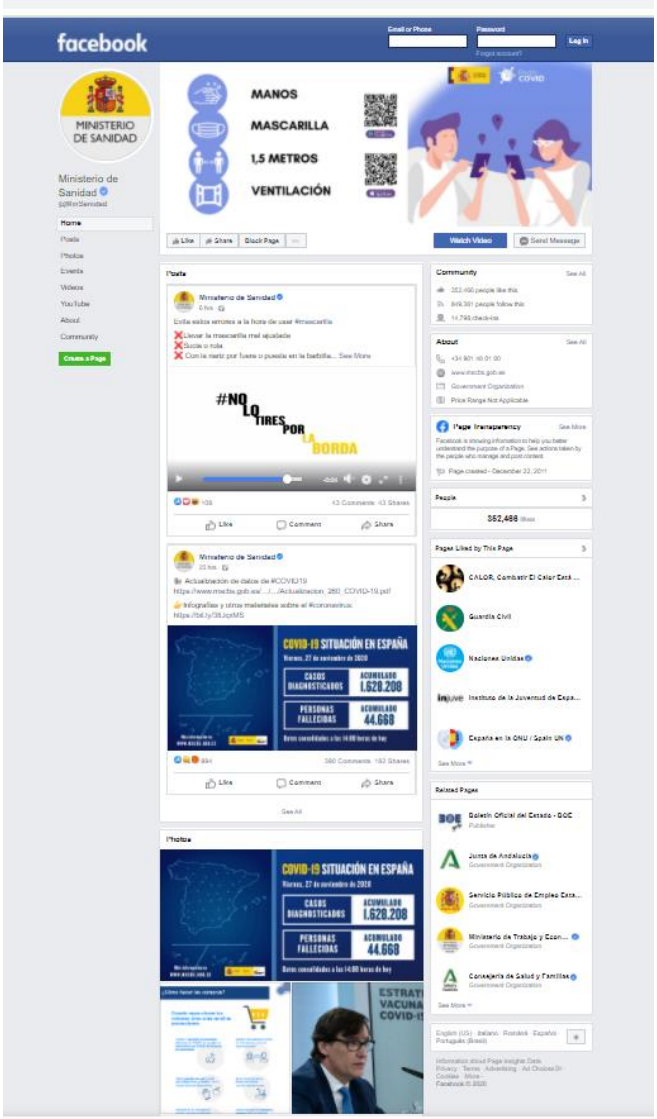

Figure 27 Facebook page of Ministry of Health.

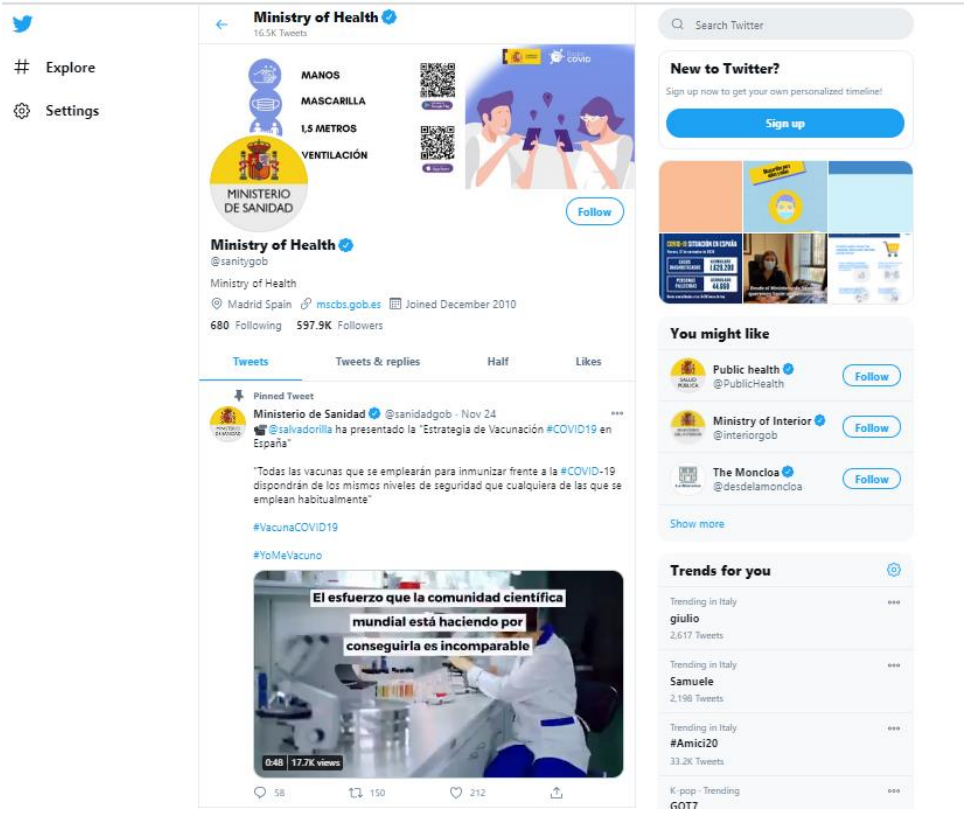

Figure 28 Twitter page of Ministry of Health.

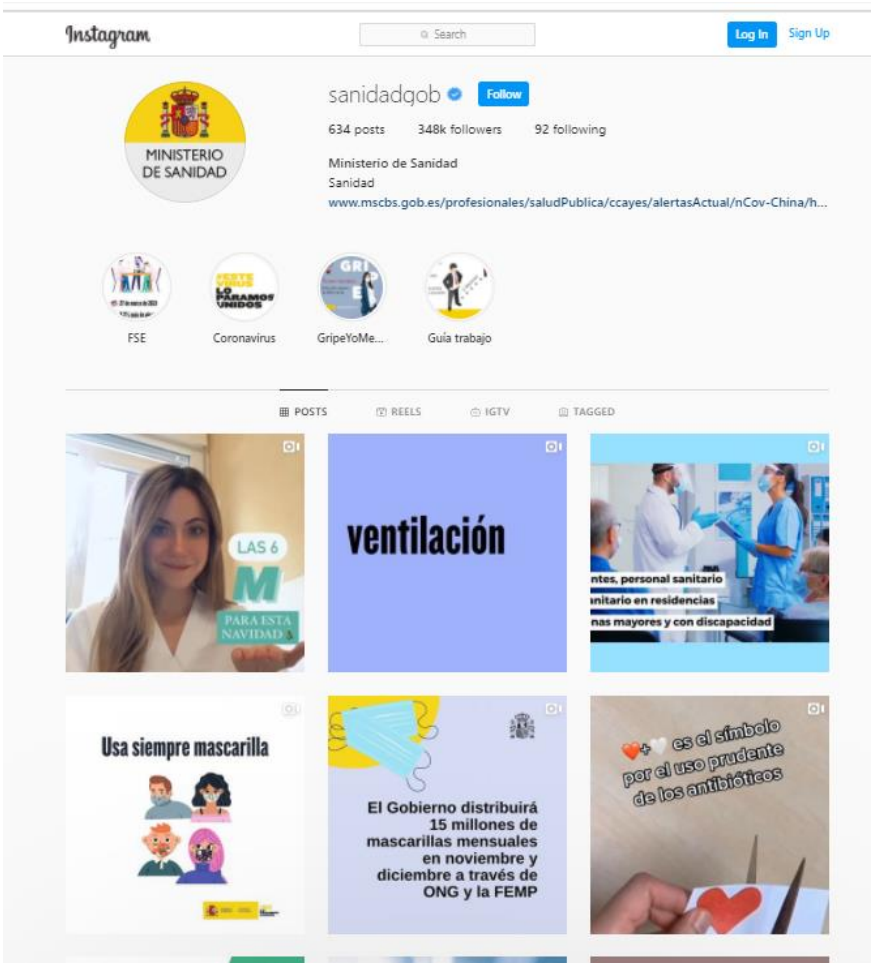

Figure 29 Instagram page of Ministry of Health.

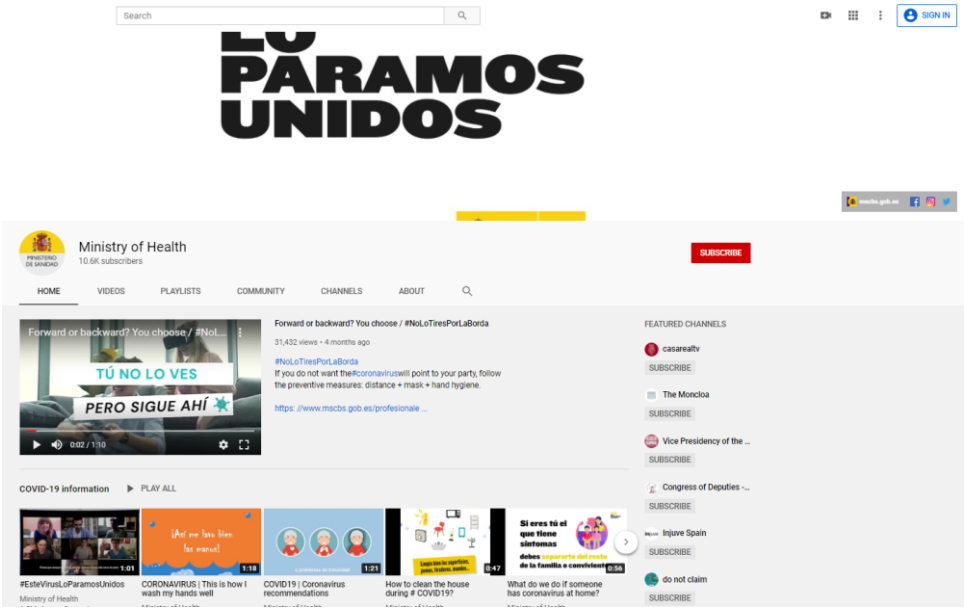

Figure 30 YouTube channel of Ministry of Health.

Figure 31 Telegram channel of Ministry of Health.

Link to factbook: https://www.facebook.com/MinSanidad/

Link to twitter: https://twitter.com/sanidadgob

Link to YouTube channel: https://www.youtube.com/user/ministeriosyps

Link to Instagram: https://www.instagram.com/sanidadgob/

Link to telegram channel: https://t.me/sanidadgob

5.2. Resource 2 – El Pais Newspaper

Data Representation

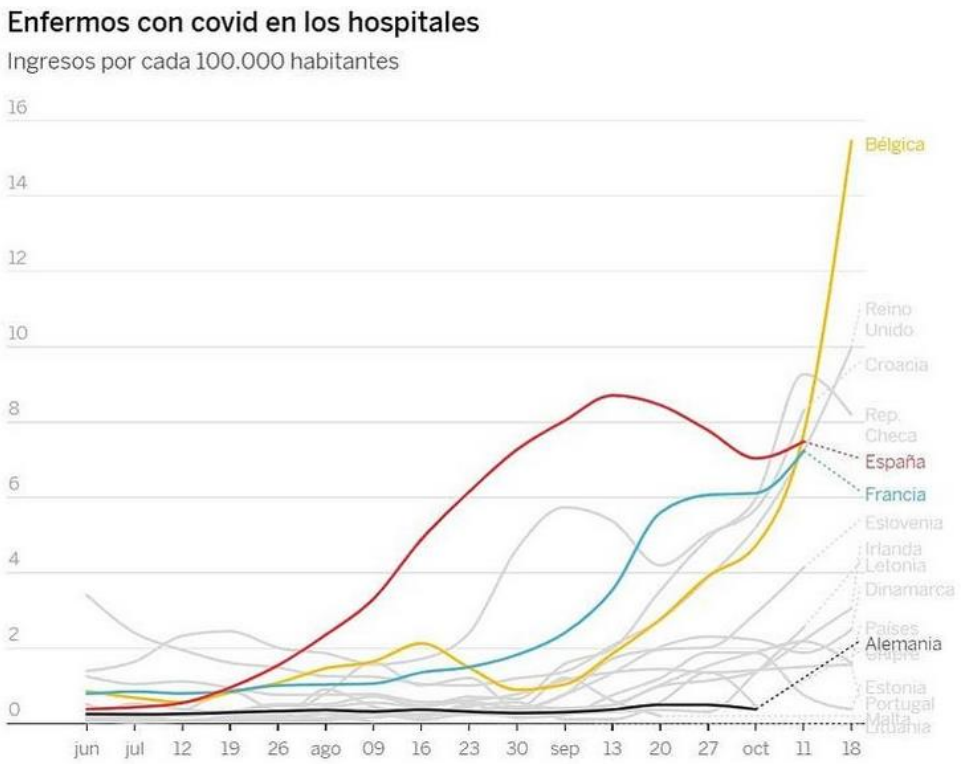

Figure 32 Comparison with other countries.

Type of the data representation: Multiple line chart

Variables Considered in this data representation: This chart compares the number of reported covid-19 patients in different countries in Europe. On the x axis the timeline starts from June 1 and end October 18.

Link to relevant post: https://www.instagram.com/p/CG7JLITjwgb/?igshid=1e6eigvdrcfzq

5.3. Points of strength and weakness

As discussed before providing necessary guidelines and spreading positive thoughts on the most available network for people (I.e., social media) can be strong point of advantage in this section. Specially the educational videos on YouTube and Instagram channels are very beneficial and useful to raise public awareness about covid-19.

However, we can say that statistical information on Instagram pages have been seriously neglected. On Instagram page of ministry of health there are no statistical information of cobid-19 at all, and on Instagram page of El Pais newspaper there are only weekly updates which is not enough comparing to the importance of the subject.