

11 September, 2020

Indicators of demographic context and territorial expression of the COVID-19 pandemic in Portugal

COVID-19: a territorial view on demographic context and territorial expression of the pandemic

The expression of the pandemic on national territory continues to be characterised by a high degree of heterogeneity. Some of the results obtained in this context:

- The preliminary number of deaths between 1 March and 30 August 2020 is 5 882 higher than the number registered in the same period in 2019. The positive variation compared to 2019 results mainly from the increase in the number of deaths in persons aged 75 and over (+ 5 162). In 164 municipalities the number of deaths registered between 3 and 30 August was higher than the same reference value.
- From the end of August, the number of new COVID-19 cases increased, with values above 2,500 new cases from September 7 (cumulative values for the last 7 days) and reaching 3,075 new cases (corresponding to 3.0 new cases per 10 thousand inhabitants) on September 9.
- On 6 September, the reference date for the latest data released by Directorate-General of Health at municipal level, for every 10 thousand inhabitants, there were 2.4 new cases of COVID-19. In 53 municipalities, the number of new cases confirmed per 10 thousand inhabitants was higher than this reference value, with 13 municipalities in the Metropolitan Area of Porto and neighbouring territories and 11 municipalities in the Metropolitan Area of Lisboa standing out.
- The analysis of the territorial concentration of new cases showed an upward trend until June 14 (last 7 days), followed by a progressive reduction, reaching the highest level of territorial dispersion of the series from April 19 to September 6, on September 6.
- In the 7 days ending on September 6, the Metropolitan Area of Lisboa represented 40% of the new cases in the country (28% of the resident population in 2019). Over the last few weeks, there has also been an increase in the number of new cases in the Metropolitan Area of Porto, reaching the values of new confirmed cases per 10 thousand inhabitants observed for the country. The new cases registered in the two metropolitan areas accounted for more than half (56%) of the total number of new cases in the country on September 6.
- On September 6, there were 58.8 cases of COVID-19 per 10 thousand inhabitants in Portugal. The analysis of the relationship between the number of confirmed cases and the number of new cases (last 7 days) per 10 thousand inhabitants showed nine municipalities in the Metropolitan Area of Lisboa with values above the national average in both indicators, which concentrated 33% of the total new cases in the country and 81% of the total new cases in the Metropolitan Area of Lisboa.
- In addition, the regression analysis of the daily series of new confirmed cases of COVID-19 showed a weekly structure characterised by the recording of a higher number of daily cases, in relative terms, on each week on working days from Tuesday to Friday, than on the other days. This pattern determines the complementary use of 7-day moving averages (or 7-day cumulative values) to assess the trend behaviour of the series.

The first cases diagnosed with COVID-19 in Portugal were reported on March 2nd 2020 and the first death as a result of COVID-19 was recorded on March 16th 2020. The WHO (World Health Organization) declared the outbreak of COVID-19 as a pandemic on March 11th 2020. On March 19, the first period of the State of Emergency was declared in Portugal, which would be renewed on April 3 and April 18. On May 3rd, the State of Calamity was declared, which was followed by three phases of deconfinement. On July 1st, the State of Alert was declared for most of the country, the State of Contingency for the Metropolitan Area of Lisboa and the State of Calamity for 19 parishes of five municipalities in the Metropolitan Area of Lisboa. On August 1st the State of Alert for the whole country was maintained and the State of Contingency was declared for the whole territory of the Metropolitan Area of Lisboa.

This press release is organized in two sections. The first section includes the usual analysis of the results of general mortality, based on the data of deaths (all causes of death) that occurred in the national territory up to August 30th. Information on deaths is obtained through the Civil Register collected under the Integrated Civil Registration and Identification System (SIRIC) until September 8th. This time lag prevents the disclosed information from being subjected to considerable revisions. Even so, the information is preliminary and will be subject to further updates.

The second section analyses the pandemic situation in Portugal, focusing on the municipality level and the territorial differentiation of the disease incidence and its most recent evolution, based on the number of COVID-19 confirmed disseminated by the Directorate-General for Health (DGS). This press release includes the information available up to September 10 (data on the situation up to September 9 for the country and up to September 6 for municipalities).

In addition, a regression analysis is presented that indicates a weekly structure in the daily series of new confirmed cases of COVID 19. The empirical results obtained suggest the use of 7-day moving averages or the cumulative values of the last 7 days for trend analysis of pandemic evolution.

I. Demographic and territorial context indicators

Number of deaths between March 1st and August 30th, 2020 higher than in the same period in 2019 and 2018

The preliminary total number of deaths between March 1st (the first cases of COVID-19 were registered on March 2 and the first death on March 16) and August 30th 2020 was 5,882 higher than the number registered in the same period in 2019 and 3,757 cases higher than number of deaths registered in 2018. The positive variation in relation to 2019 was due mainly to the increase in the number of deaths of people aged 75 and over (+ 5,162).

Figure 1 - Cumulative number of deaths in Portugal from March 1st to August 30th (2018-2020)

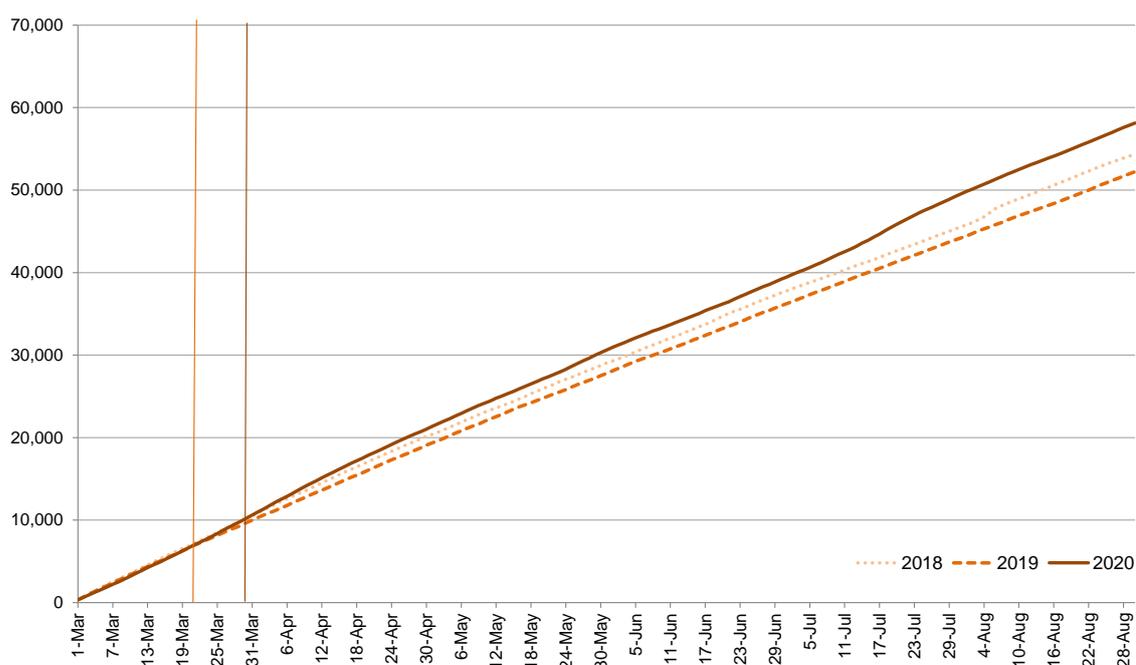
	Number of deaths			Number of deaths per 100 thousand inhabitants		
	2018	2019	2020	2018	2019	2020
Total	54,367	52,242	58,124	528.3	508.4	564.5
Males	27,217	26,149	28,561	559.1	538.9	587.7
Females	27,149	26,093	29,563	500.6	481.0	543.8
Under 64 years	8,086	7,916	8,174	100.1	98.6	102.0
65 to 69 years	3,307	3,322	3,483	533.5	537.4	559.1
70 to 74 years	4,589	4,541	4,836	880.0	843.4	879.9
75 to 79 years	6,407	5,873	6,624	1,507.5	1,378.1	1,533.1
80 to 84 years	9,651	9,034	10,012	2,762.6	2,572.5	2,834.2
85 years and over	22,321	21,553	24,986	7,501.9	6,946.4	7,745.0
65 years and over	46,275	44,323	49,941	2,090.8	1,975.0	2,190.0
75 years and over	38,379	36,460	41,622	3,580.5	3,352.3	3,756.8

Source: Statistics Portugal, Deaths and Annual estimates of resident population.

Notes: a) 2020 data: preliminary data based on information registered by the Civil Register Offices and sent to Statistics Portugal until September 8th 2020. b) The total number of deaths may not correspond to the sum of the partial figures due to the existence of records with unknown age.

Figures 2 and 3 allow the comparison of the cumulative number of deaths from March to September 30th 2020 with that observed in the same period in 2019 and 2018. The total number of deaths registered in 2020 surpassed those registered in 2018 and 2019 on March 20th and 30th, respectively, identified by the time lines inserted in the figures. Regarding deaths of people aged 75 and over these dates were March 19th and 30th, respectively.

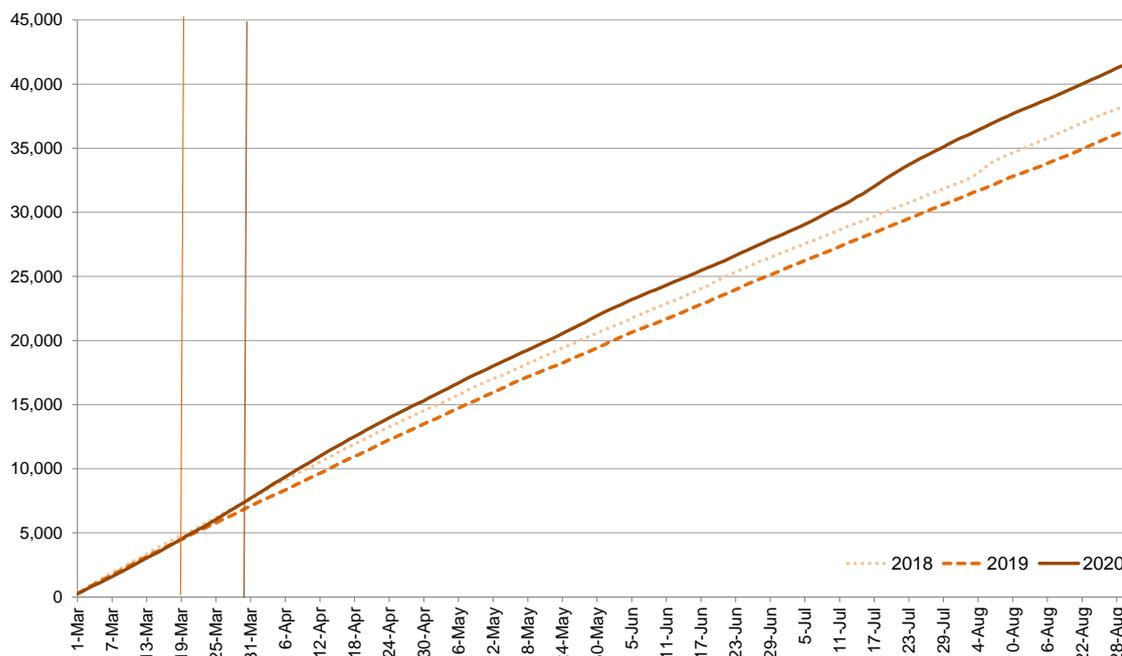
Figure 2 - Cumulative number of deaths, by day of death, March 1st to August 30th (2018-2020)



Source: Statistics Portugal, Deaths.

Note: 2020 data: preliminary data based on information registered by the Civil Register Offices and sent to Statistics Portugal until September 8h 2020.

Figure 3 - Cumulative number of deaths aged 75 and over, by day of death, March 1st to August 30th (2018-2020)

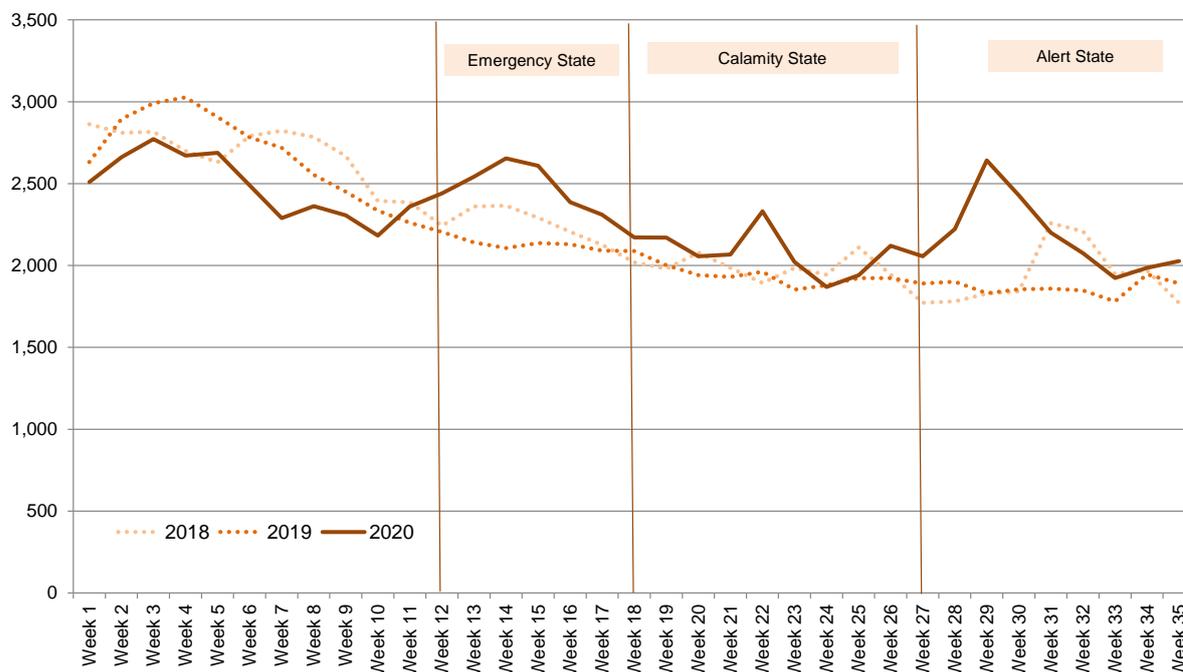


Source: Statistics Portugal, Deaths.

Note: 2020 data: preliminary data based on information registered by the Civil Register Offices and sent to Statistics Portugal until September 8th 2020.

Figures 4 and 5 compare the total number of deaths and the number of deaths of people aged 75 and over, registered in Portugal, per week until the 35th week of 2020 (week from August 24th to 30th), with the same weeks of 2018 and 2019. These show that between weeks 12 (March 16th to 22nd) and 23 (June 1st to 7th), the number of deaths in 2020 exceeds the number of deaths registered in the same weeks of 2018 and 2019, resuming lower values in the weeks 24 and 25 (June 8th to 21st). Between weeks 26 and 30, the number of deaths again exceeds the observed number of deaths in the same weeks of 2018 and 2019, with a peak at week 29 (June 13th to 19th). Between weeks 31 (July 27th to August 2nd) and 33 (August 10th to 16th), the number of deaths remains higher than the values observed in 2019, but lower than the values observed in 2018. In the last two weeks (34th and 35th) the number of deaths again exceeds the observed number of deaths in the same weeks of 2018 and 2019.

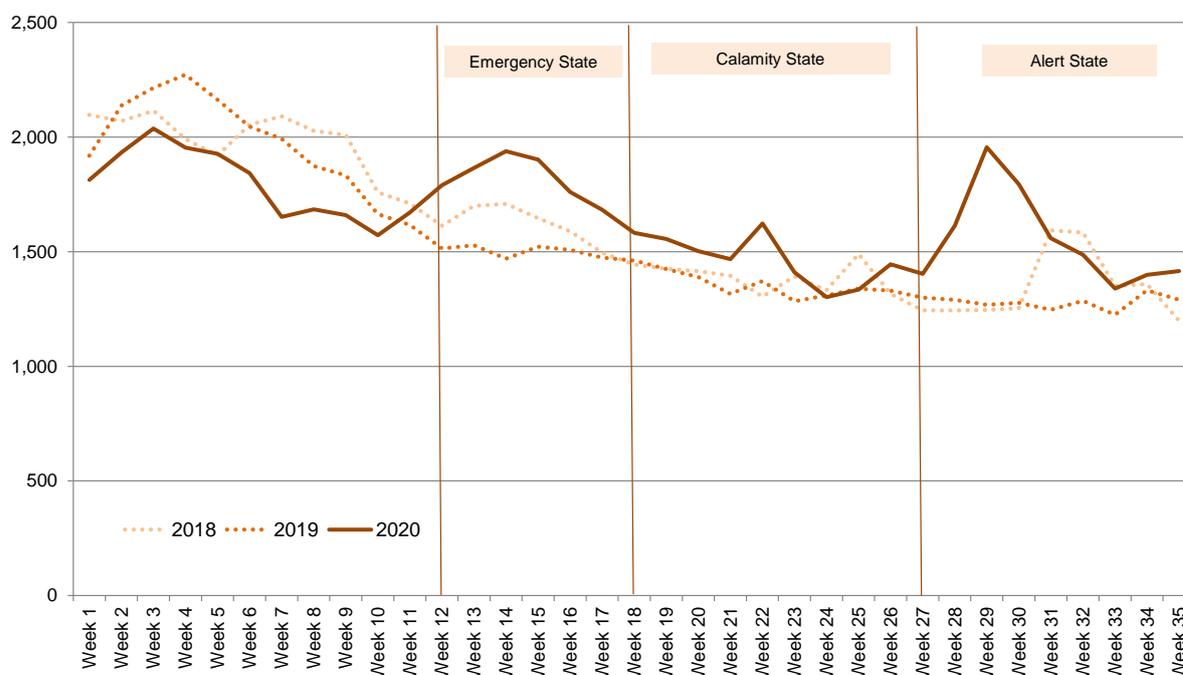
Figure 4 – Number of deaths by week of death, weeks 1 to 35 (2018-2020)



Source: Statistics Portugal, Deaths.

Note: 2020 data: preliminary data based on information registered by the Civil Register Offices and sent to Statistics Portugal until September 8th 2020.

Figure 5 – Number of deaths ages 75 and over by week of death, weeks 1 to 35 (2018-2020)



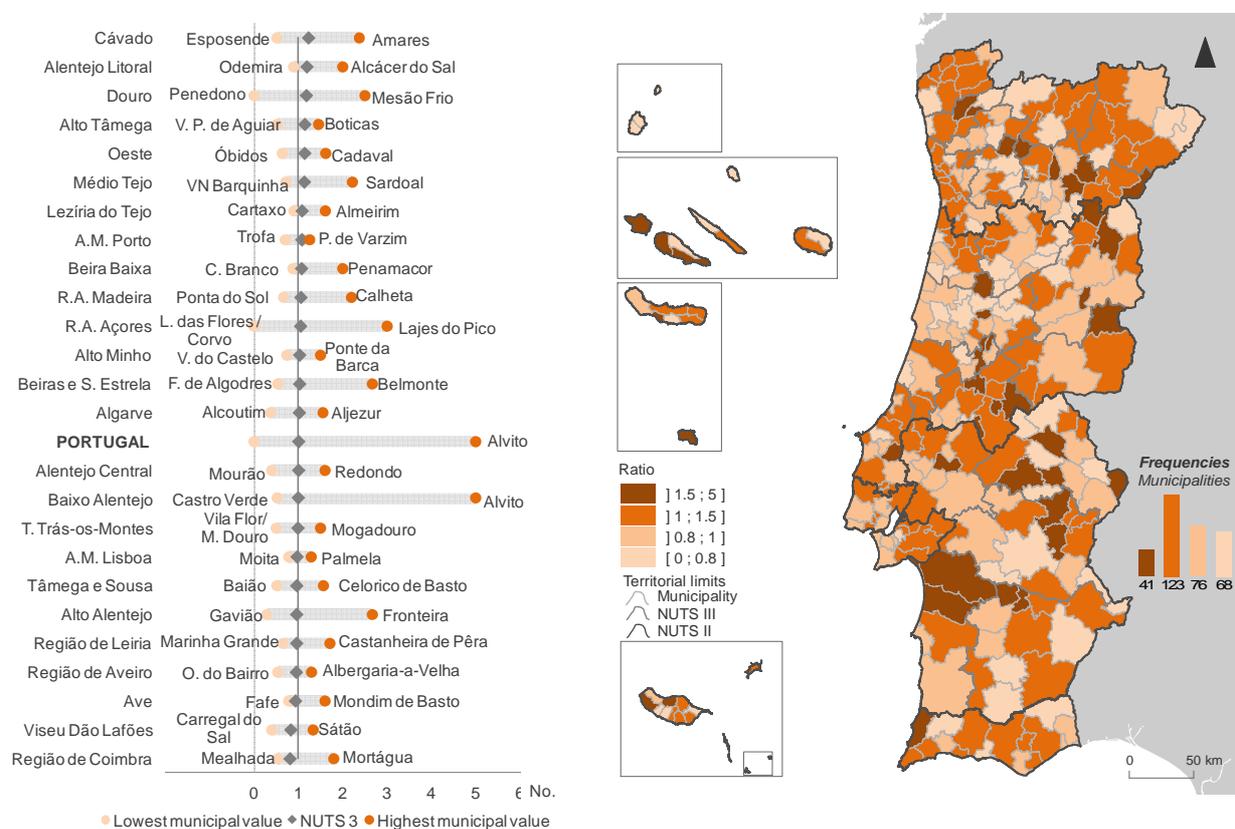
Source: Statistics Portugal, Deaths.

Note: 2020 data: preliminary data based on information registered by the Civil Register Offices and sent to Statistics Portugal until September 8th 2020.

In 164 municipalities the number of deaths registered in the last four weeks (between 3 and 30 August, 2020) was higher than the corresponding reference value

In 164 out of the 308 Portuguese municipalities the number of deaths registered in the last four weeks (between 3 and 30 August, 2020) was higher than the corresponding reference value (average for the same period in 2018 and 2019). Of this total, 41 municipalities registered a number of deaths 1.5 times higher than in the same period of reference. For the remaining 144 municipalities the number of deaths registered in the last four weeks was equal or lower than the number observed in the reference period [Figure 6].

Figure 6- Number of deaths in the last four weeks (3 to 30 August) per deaths in the same period of reference, Portugal, NUTS 3 and municipality



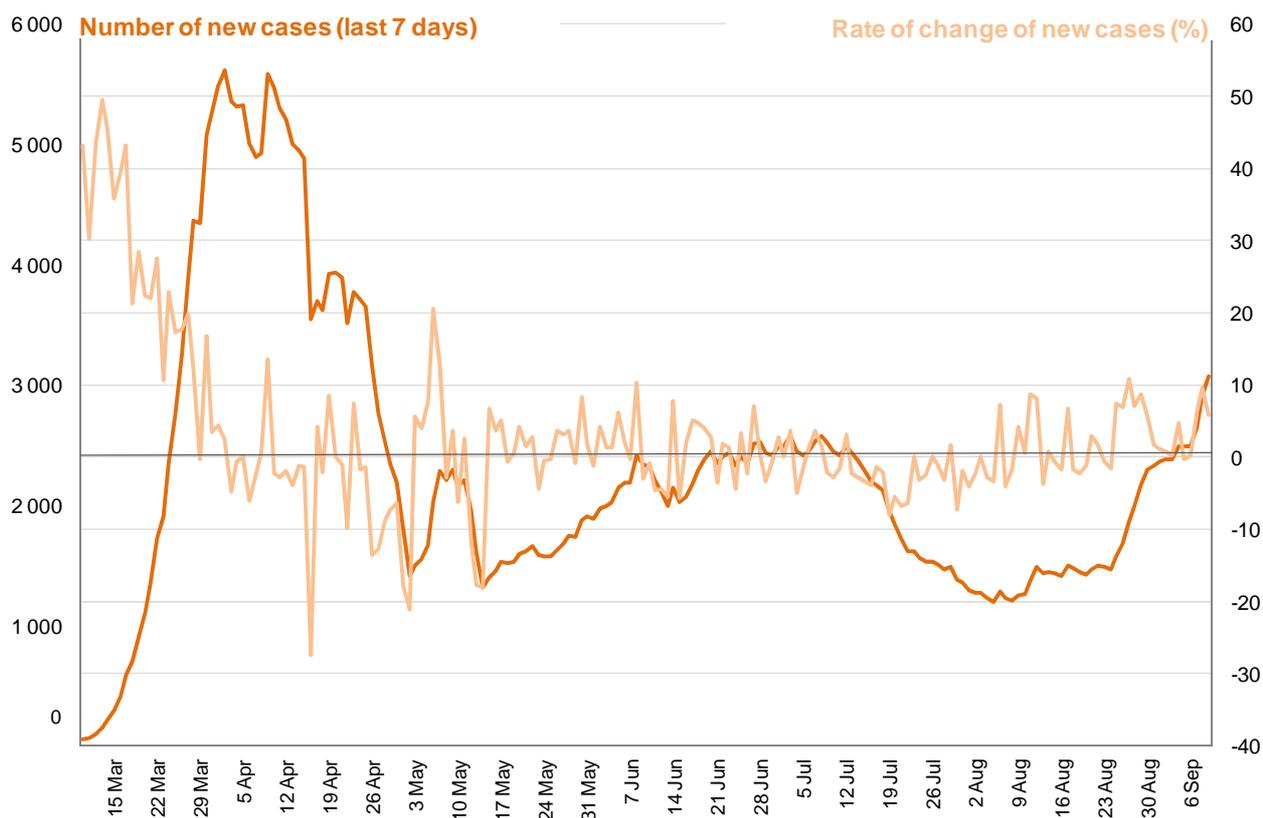
Source: INE, I.P., Statistics on Deaths (Preliminary (2020) and Final Results (2018 and 2019)).

Note: The lowest municipal values for Portugal correspond to the values of the municipalities of Corvo, Lajes das Flores and Penedono.

II. The expression of the pandemic in the municipalities

Based on the data released daily of the total of confirmed cases of COVID-19, it is possible to make an analysis of the evolution of the new cases of COVID-19 disease (last 7 days) since the beginning of March until the present moment (September 9). According to the following figure, it is possible to observe an exponential increase of new cases of COVID-19 from the moment the first case was registered in Portugal at the beginning of March, and on April 2 the highest value of new confirmed cases (5,618, corresponding to 5.5 new cases per 10,000 inhabitants). From that date onwards, there has been an overall gradual downward trend, with the number of new cases (last 7 days) falling below the threshold of 2,500 new cases from 29 April to 27 June, remaining relatively around that value until 9 July (2,523 new cases per 10,000 inhabitants). From that date onwards, there was again a downward trend, with values below 2,000 new cases (last 7 days) remaining until 28 August (1,996, 1.9 cases per 10,000 inhabitants), and there was a further upward trend from this last data onwards, with values above 2,500 new cases from September 7 and reaching 3,075 new cases (corresponding to 3.0 new cases per 10,000 inhabitants) on September 9.

Figure 7- Number of new confirmed cases of COVID-19 (last 7 days) and corresponding rate of change, Portugal, per day

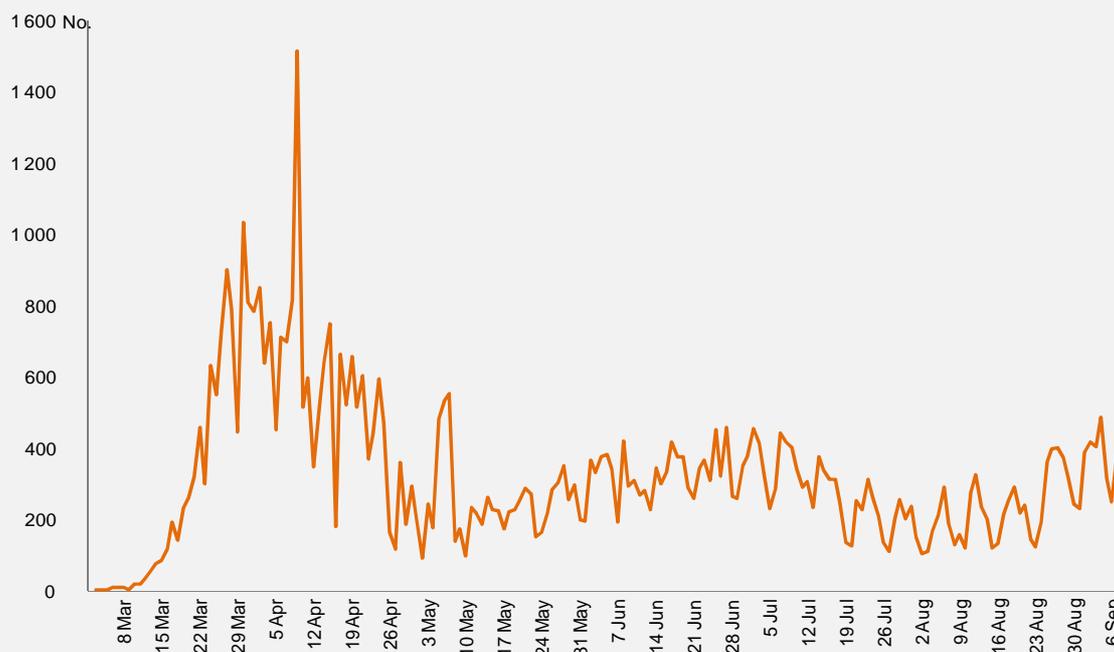


Source: Directorate-General of Health, Daily COVID-19 Status Report (released on September 10).
Note: The dates marked on the graph axis correspond to Sundays.

Time structure of the daily series of new confirmed cases of COVID-19 and the use of 7-day moving averages

Every day the number of new confirmed cases of infected persons corresponding to the cases registered up to 24 hours of the previous day is disseminated. The resulting time series seems to show calendar effects which are expressed systematically by a higher number of daily cases, in relative terms, on each week on working days from Tuesday to Friday than on the other days [Figure 8].

Figure 8: Number of new confirmed cases of COVID-19, Portugal, per day



Source: Directorate-General of Health, Daily COVID-19 Status Report (released on September 10).
Note: The dates marked on the graph axis correspond to Sundays.

Given the already significant size of the available series, a set of linear regressions was performed to test whether or not this perception was adjusted. The results obtained with the various specifications tested indicated the existence of a weekly structure in the daily series of new cases. As an illustration, the following figure presents the results of one of the regressions tested in which the natural logarithm of the number of new cases was assumed as a dependent variable and as independent variables the same variable with one day lag (Inc-1) and two days lag (Inc-2), to control for the effect of the trend on the weekly structure of the series, and a binary variable (b) which assumes the value 1 when the new cases are registered on Saturday, Sunday and Monday, and 0 on the remaining days of the week.

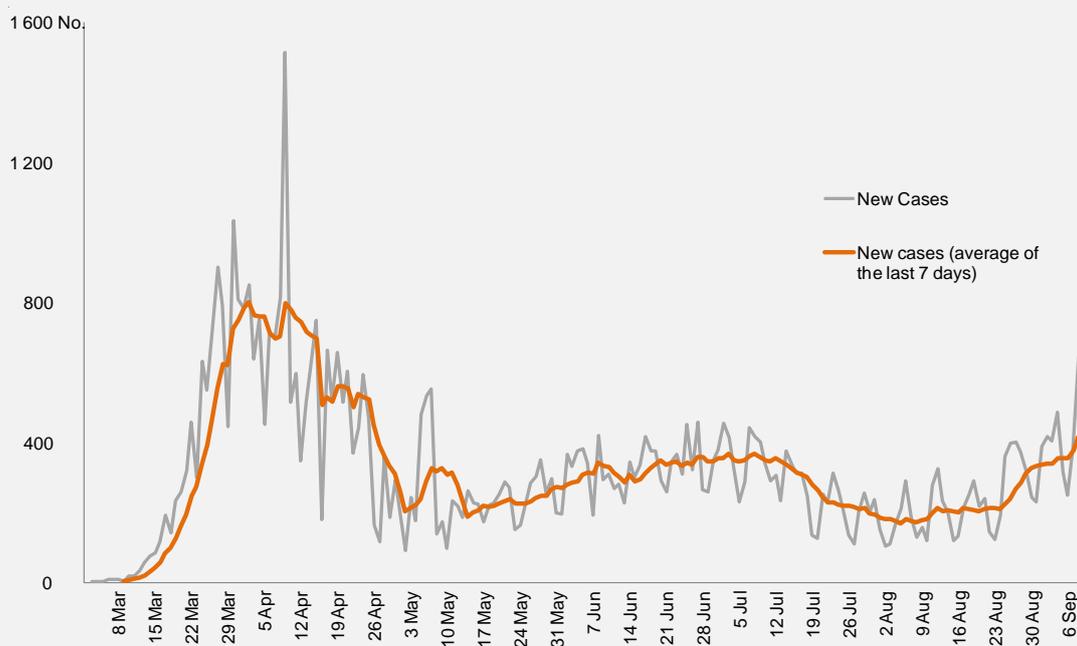
Figure 9: Results of the multiple linear regression

	Coefficients	t Stat	P-value (*)
constant	1,08	6,55	5,46E-10
Inc-1	0,46	6,71	2,29E-10
Inc-2	0,38	5,90	1,67E-08
b	-0,33	-5,70	4,63E-08
Number of observations: 189			
R²	0,83		

(*)Values presented in scientific notation.

As can be seen in Figure 9, the number of new daily cases recorded on Saturday, Sunday and Monday tends to be about 1/3 lower than those observed daily from Tuesday to Friday. Thus, given this empirical evidence of a weekly structure, it is justified to calculate a moving average of 7 days [Figure 10], or the cumulative value after 7 days, to support the analysis of the evolution of the series of new daily cases, as presented in the [COVID-19 Dashboard](#) on Statistics Portugal website.

Figure 10: New confirmed cases of COVID-19 and average number of new confirmed cases in the last 7 days, Portugal, per day



Source: Directorate-General of Health, Daily COVID-19 Status Report (released on September 10).
Note: The dates marked on the graph axis correspond to Sundays.

53 municipalities registered new confirmed cases of COVID-19 disease per 10,000 inhabitants above the national value

On 9 September 2020, for every 10 thousand inhabitants in Portugal, there were 3.0 new confirmed cases of COVID-19 (last 7 days). On 6 September 2020, the date of the last data update at municipality level, there were 2.4 new confirmed cases of COVID-19 (last 7 days) per 10 thousand inhabitants in the country.

The number of new cases confirmed with COVID-19 disease (last 7 days) per 10 thousand inhabitants was higher than the national value in 53 municipalities. In the Norte region, 29 municipalities registered a value above the national reference, highlighting a set of 13 municipalities in the Metropolitan Area of Porto (AMP) and neighbouring territories - Arouca, Póvoa de Varzim, Vila do Conde, Santo Tirso and Paredes in the AMP, and the municipalities of Lousada, Felgueiras, Paços de Ferreira, Castelo de Paiva and Penafiel in Tâmega e Sousa, and Guimarães, Vila Nova de Famalicão and Vizela in Ave. With values higher than seven new cases per 10 thousand inhabitants, the municipalities of Sernancelhe (Douro) and Vimioso (Terras de Trás-os-Montes) also stood out.

In the Metropolitan Area of Lisboa (AML), out of the total of 18 municipalities, 11 showed values above the national average: Sintra and Amadora, with five or more confirmed cases per 10 thousand inhabitants, followed by the municipalities of Vila Franca de Xira, Odivelas, Lisboa, Oeiras, Loures, Setúbal, Barreiro, Mafra and Seixal. Also some municipalities in the Centro regions (the municipalities of Arruda dos Vinhos, Santa Comba Dão, Cantanhede, Águeda and Sátão), Alentejo (the municipalities of Odemira, Santarém, Reguengos de Monsaraz, Campo Maior, Sines, Benavente and Mora) and Algarve (the municipality of Loulé) scored values above the national value [Figure 11].

The calculation of the location coefficient considering the new confirmed cases (last 7 days) calculated for April 19, May 17, June 14, July 12, August 9 and September 6 suggests higher levels of territorial concentration of the new confirmed cases of COVID-19 on June 14. Up to this date, the trend has been towards a higher concentration of the new cases registered, with a subsequent reduction in the concentration of new cases in relation to the population distribution among municipalities. Considering the series of location coefficients based on the new confirmed cases (last 7 days) estimated for every Sunday from April 19 to September 6, it can be seen that the lowest level of concentration occurred in September and the highest on June 14 [Figure 12].

Figure 11 - Number of new confirmed cases of COVID-19 (last 7 days) per 10 thousand inhabitants until September 6, 2020, by municipality

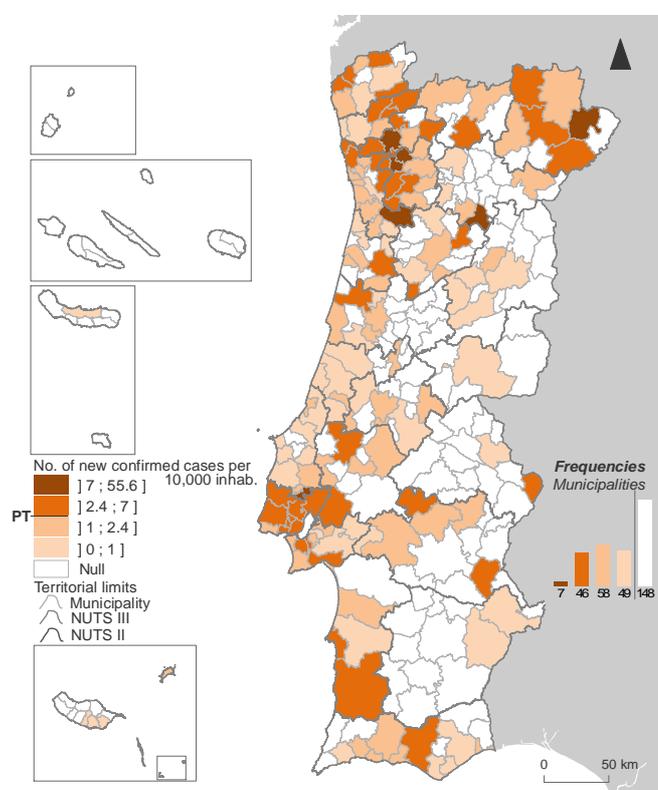
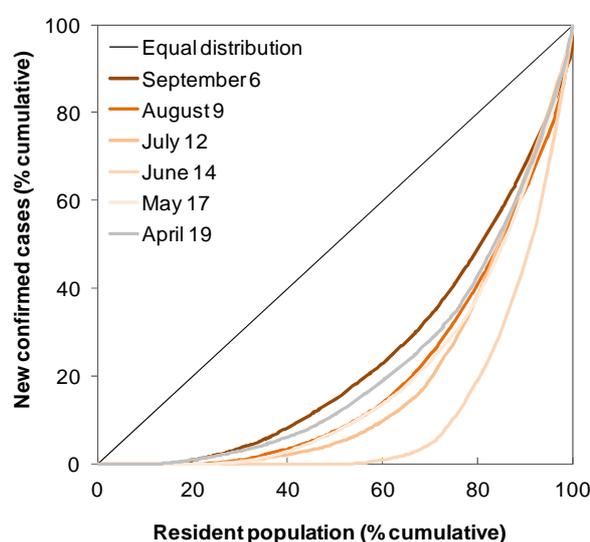


Figure 12 - Territorial concentration of new confirmed cases of COVID-19 (last 7 days) on April 19, May 17, June 14, July 12, August 9 and September 6 in relation to the resident population, based on the distribution by municipality

Location Curve



<i>Location coefficient</i>	
September 6 - Sunday	37.2
August 9 - Sunday	46.4
July 12 - Sunday	51.7
June 14 - Sunday	65.8
May 17 - Sunday	47.1
April 19 - Sunday	41.9

Source: Directorate-General of Health, Daily COVID-19 Status Report (released on September 10); INE, I.P., Annual estimates of resident population, 31 December 2019. Note: For the calculation of the location coefficients zero cases were considered for the municipalities with no value in the Directorate-General of Health report (0 or < 3 cases).

The following figure shows the number of new cases of COVID-19 (last 7 days) per 10,000 inhabitants by municipality for every Sunday from April 12 to September 6, allowing a visualization of the incidence of new cases in different municipal contexts over time. Thus, it is possible to observe that there is a higher incidence of new cases in municipalities located in the Norte region in the month of April (12th, 19th and 26th) and then, in June and July, there is a higher incidence of new cases in municipalities in the Metropolitan Area of Lisboa, particularly on July 12th. It is also important to highlight the occasional incidence of new cases in some municipalities scattered throughout the country, such as the situation in the municipality of Reguengos de Monsaraz in the week ending in 28 of June, the municipality of Miranda do Douro in the weeks ending in 12 and 19 of July and, more recently, the situation in the municipality of Mora on 16 and 23 of August.

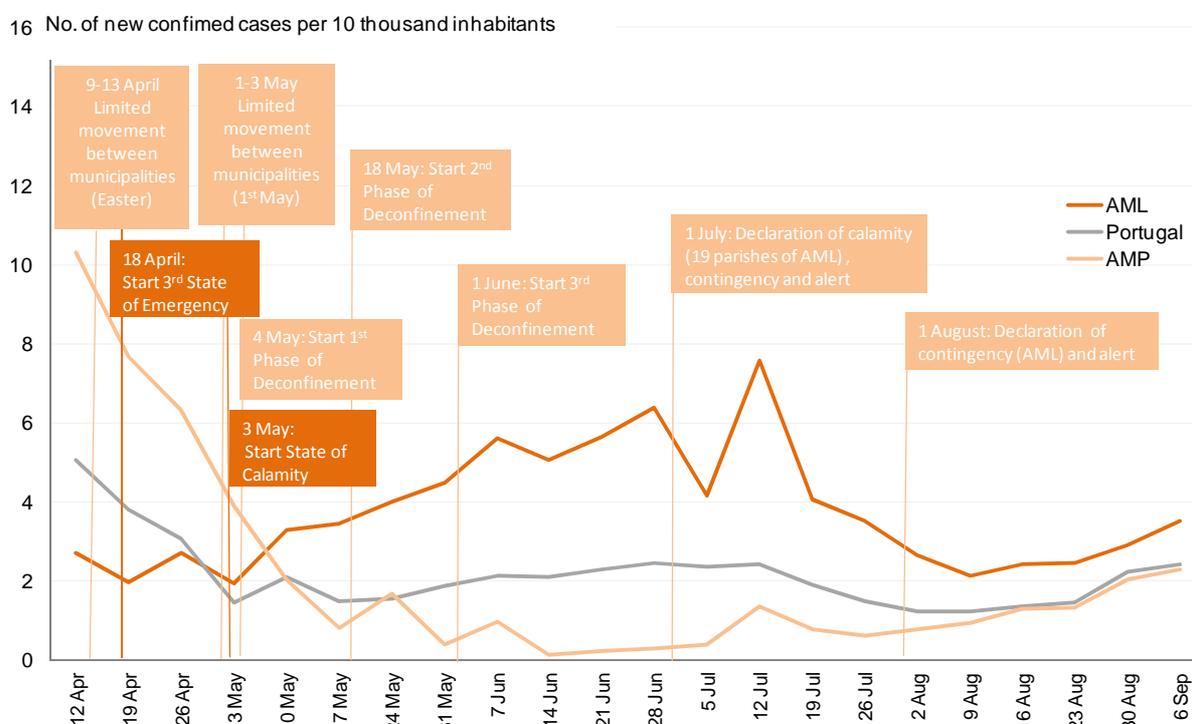
Figure 13 - New confirmed cases of COVID-19 (last 7 days) per 10,000 inhabitants, Sundays -12 April to 6 September, by municipality



Source: Directorate-General of Health, Daily COVID-19 Status Report (released on September 10); INE, I.P., Annual estimates of resident population, 31 December 2019.
Note: The municipalities with no data correspond to municipalities with a case number of zero or less than 3.

The following figure shows the new cases in the last 7 days per 10 thousand inhabitants for the total of the country and for the metropolitan areas of Porto and Lisboa for the Sundays of 12 April to 6 September. It highlights the progressive slowdown of new cases registered in the Metropolitan Area of Porto and, in the opposite direction, the increase of new cases in the Metropolitan Area of Lisboa (AML), registering this region values above the national average since the week ended on 3 May. In the 7 days ending on 6 September, AML represented 40% of new cases in the country (28% of the resident population in 2019). It should also be noted that over the last few weeks there has been an increase in the number of new cases in the Metropolitan Area of Porto, reaching the values of new confirmed cases per 10 thousand inhabitants observed for the country. The new cases registered in the two metropolitan areas accounted for more than half (56%) of the total number of new cases in the country on September 6.

Figure 14 - New confirmed cases of COVID-19 (last 7 days) per 10,000 inhabitants, Portugal, metropolitan areas of Lisboa and Porto
Sundays -12 April to 6 September,

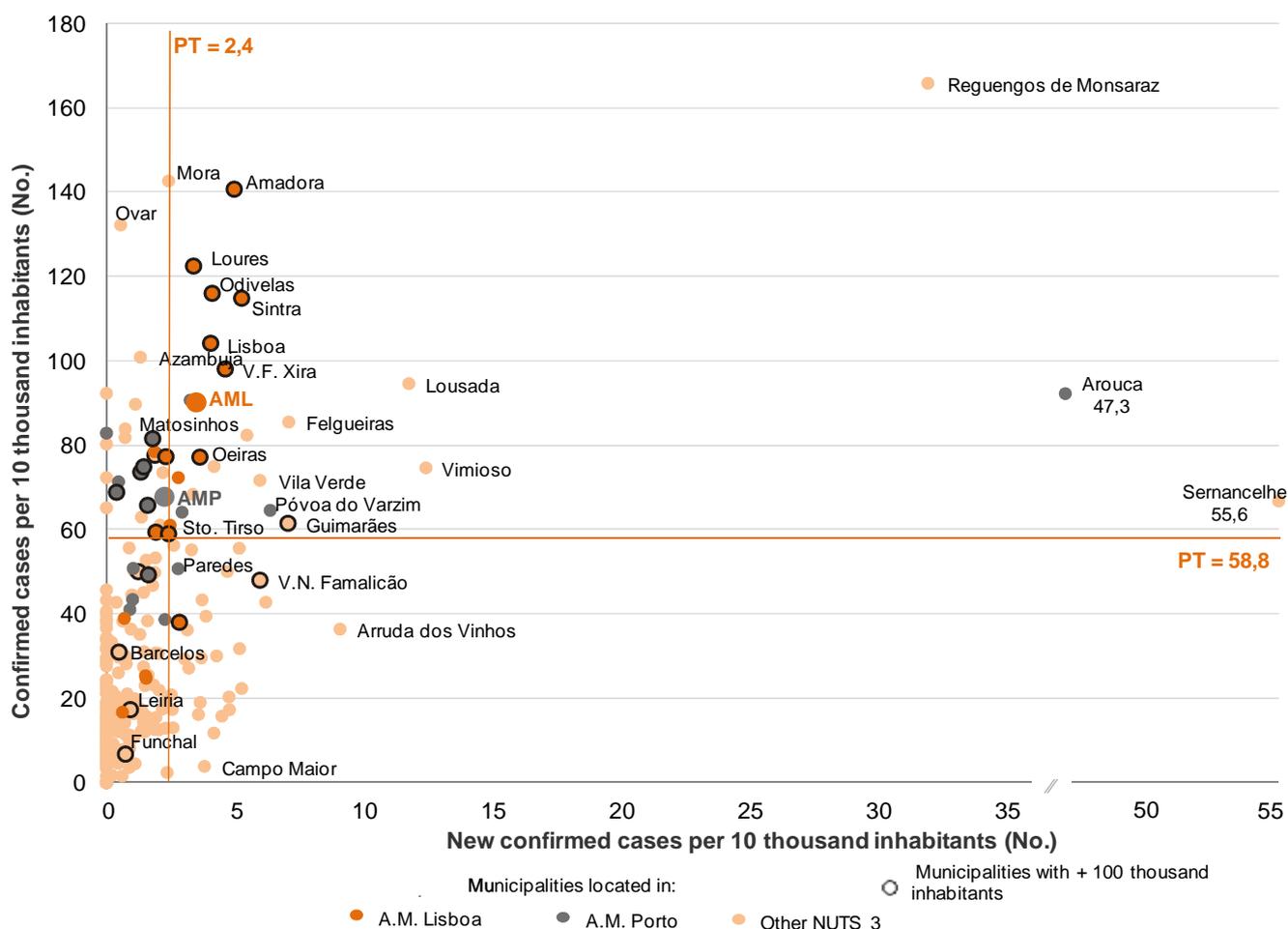


Source: Directorate-General of Health, Daily COVID-19 Status Report (released on September 10); INE, I.P., Annual estimates of resident population, 31 December 2019.

24 municipalities registered simultaneously a number of new cases per 10,000 inhabitants and a total of confirmed cases per 10,000 inhabitants above the national value

The following figure illustrates the relationship between the total number of confirmed cases per 10 thousand inhabitants by 6 September and the number of new confirmed cases per 10 thousand inhabitants on 6 September (last 7 days). Of the 48 municipalities with a number of confirmed cases above the figure for Portugal, 24 also scored a number of new confirmed cases per 10 thousand inhabitants above the national average, and of this group, nine municipalities were located in the Metropolitan Area of Lisboa - Sintra (5.3 new cases per 10 thousand inhabitants), Amadora (5.0), Vila Franca de Xira (4.6), Odivelas (4.1), Lisboa (4.1), Oeiras (3.7), Loures (3.4), Barreiro (2.8) and Mafra (2.5). In the 7 days ending on 6 September, those municipalities represented 33% of the new cases in the country and 81% of the AML.

Figure 15 – Number of confirmed cases per 10 thousand inhabitants on September 6, 2020 and Number of new confirmed cases per 10 thousand inhabitants on September 6 2020 (last 7 days), by municipality



Source: Directorate-General of Health, Daily COVID-19 Status Report (released on September 10); INE, I.P., Annual estimates of resident population, 31 December 2019.

48 municipalities with confirmed cases of COVID-19 disease per 10 thousand inhabitants above the national value

On September 9, 2020, in Portugal, for every 10 thousand inhabitants there were 60.3 confirmed cases of COVID-19, which represents an increase of 30% compared to July 15, the reference date of the last press release.

On September 6, 2020, the date of the last data update at municipality level, there were 58.8 confirmed cases of COVID-19 per 10 thousand inhabitants in the country. The number of confirmed cases with COVID-19 disease per 10 thousand inhabitants was higher than the national value in 48 municipalities.

In the Norte region, 27 municipalities registered a value above the country, nine with more than 80 confirmed cases per 10,000 inhabitants: Arouca, Vila do Conde, Valongo and Matosinhos, in the Metropolitan Area of Porto, the municipalities of Lousada, Felgueiras and Paços de Ferreira in Tâmega e Sousa, the municipality of Miranda do Douro in Terras de Trás-os-Montes and the municipality of Melgaço in Alto Minho.

In the Metropolitan Area of Lisboa (AML), 12 municipalities scored values above the national one: Moita, Cascais, Oeiras, Barreiro, Mafra and Almada, with Amadora, Loures, Odivelas, Sintra, Lisbon and Vila Franca de Xira standing out with more than 80 cases confirmed by 10 thousand inhabitants. Some municipalities in the Centro Region (the municipalities of Ovar, Condeixa-a-Nova, Castro Daire and Alenquer), Alentejo (the municipalities of Reguengos de Monsaraz, Mora, Azambuja and Moura) and in Região Autónoma dos Açores (the municipality of Nordeste) also had values higher than the national value [Figure 15].

Despite this differentiation, the estimated location coefficient¹ for April 5 and September 6 suggests a decrease in territorial concentration of cases, i.e., a progressive spatial dissemination throughout the country. The location curves graphically reflect this trend by the approximation to the straight line of equal distribution between the number of confirmed cases and the resident population in the municipalities [Figure 16].

Figure 24 - Number of confirmed cases of COVID-19 disease per 10 thousand inhabitants until September 6, 2020, by municipality

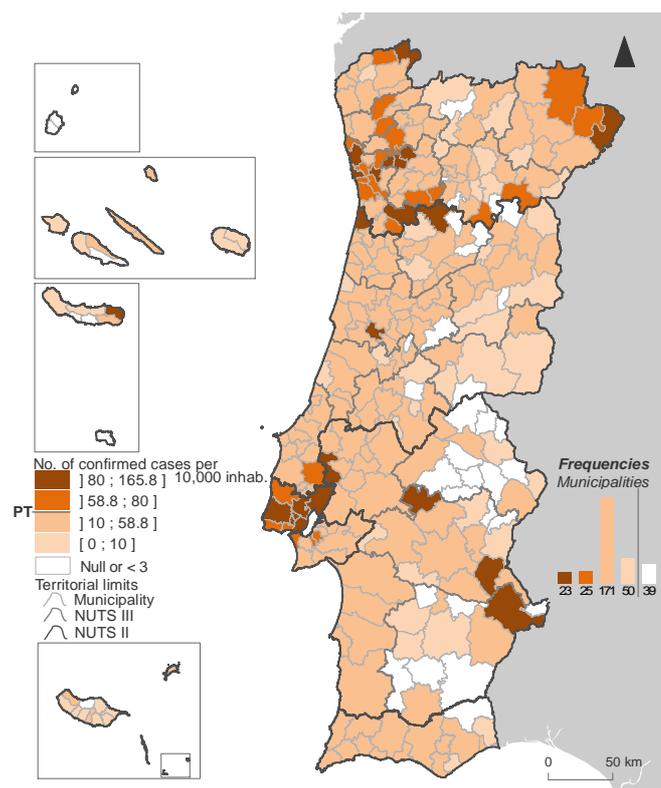
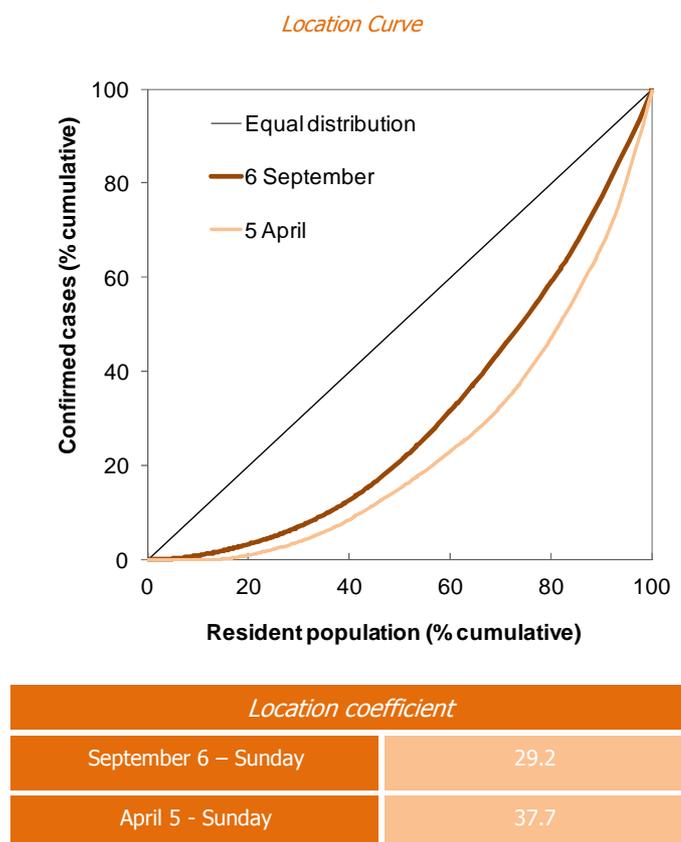


Figure 25 - Territorial concentration of COVID-19 confirmed cases until April 5 and September 6 in relation to the resident population, based on the distribution by municipality



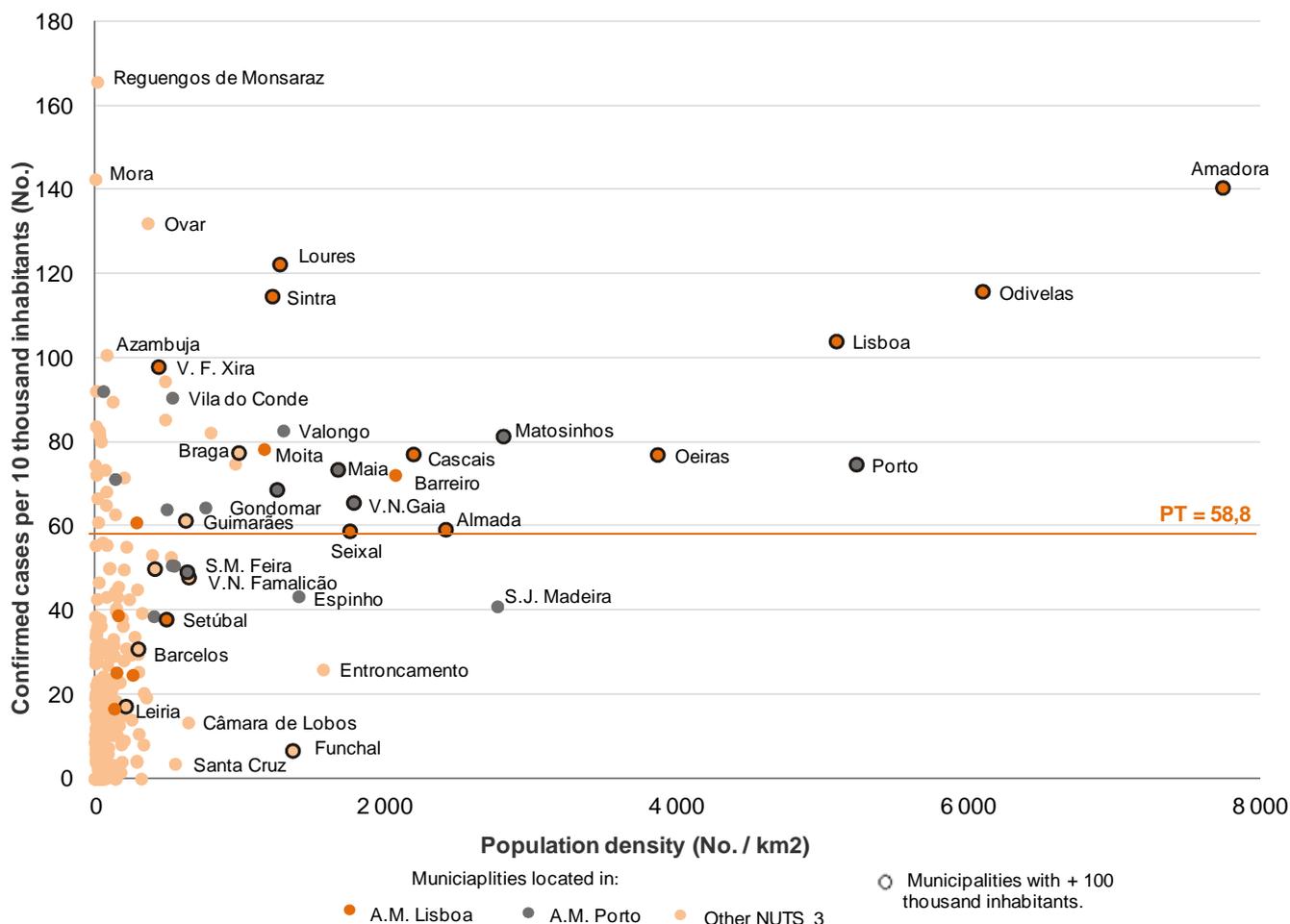
Source: Directorate-General of Health, Daily COVID-19 Status Report (released on September 10); INE, I.P., Annual estimates of resident population, 31 December 2019.
Note: For the calculation of the location coefficients zero cases were considered for the municipalities with no value in the Directorate-General of Health report (0 or < 3 cases).

¹ The Location coefficient varies between 0 and 100, with values closer to 100 reflecting greater inequality in the distribution of confirmed cases of COVID-19 against the total resident population.

32 municipalities registered both a number of confirmed cases per 10 thousand inhabitants and population density values above the national reference

The following figure illustrates the relationship between population density and the number of confirmed cases per 10 thousand inhabitants. Of the 48 municipalities with a number of confirmed cases per 10 thousand inhabitants above the value for Portugal, 32 also had population density values above the national average. From this set of 32 municipalities, the following municipalities recorded more than 80 confirmed cases by 10,000 inhabitants: Amadora (140.5), Loures (122.2), Odivelas (115.8), Sintra (114.6), Lisboa (103.9) and Vila Franca de Xira (97.8) in the Metropolitan Area of Lisboa, Ovar (132.1), in Região de Aveiro, Lousada (94.5), Felgueiras (85.4) and Paços de Ferreira (82.3) in Tâmega e Sousa, Condeixa-a-Nova (89.7), in Região de Coimbra, Vila do Conde (90.6), Valongo (82.8) and Matosinhos (81.3), in the Metropolitan Area of Porto. It should also be noted that 180 of the 308 municipalities in the country had a number of confirmed cases per 10 thousand inhabitants and population density below the national reference.

Figure 18 - Number of confirmed cases per 10 thousand inhabitants on September 6, 2020 and Population density, by municipality



Source: Directorate-General of Health, Daily COVID-19 Status Report (released on September 10); INE, I.P., Annual estimates of resident population, 31 December 2019.

Technical note

Data sources

Data on [Deaths](#) correspond to general deaths (all causes of death) occurring in the national territory since March 1st, 2020 and until the Tuesday of the week prior to publication. The information is preliminary and is obtained from statistical operations of direct and exhaustive collection on deaths occurring in Portuguese territory using facts that are subject to compulsory civil registration (death) in the *Sistema Integrado do Registo e Identificação Civil* (SIRIC). In addition to administrative information obtained from Civil Register Offices, Statistics Portugal collects an additional set of variables identified as statistically relevant to the National Statistical System (NSS) and the European Statistical System (EES). Data are recorded and sent electronically, in compliance with the requirements set out by Statistics Portugal and laid down in liaison with the *Instituto de Registos e Notariado* (IRN) and the *Instituto de Gestão Financeira e Equipamentos da Justiça* (IGFEJ).

Data on the number of confirmed cases are based on those published daily in the [Directorate-General of Health COVID-19 Status Report](#) for the entire country and by municipality. The confirmed cases are referenced to the municipality of occurrence and correspond to the total of clinical notifications in the SINAVE (National System of Epidemiological Surveillance) system. For the reference dates considered in this press release data by municipality corresponded, respectively, to 91% of confirmed cases in the national territory. This proportion reflects data confidentiality by municipality, but also limitations in the process of spatial referencing of information. In fact, when the confirmed cases by municipality are fewer than 3, for confidentiality reasons, data are not disclosed by the Directorate-General of Health.

This press release includes the resident population data as of December 31, 2019 released on June 15.

Disseminated Indicators

Population density

Number of total deaths, by sex or age group

Number of deaths in the last 4 weeks per deaths in the same reference period

Number of confirmed cases of COVID-19 disease per 10 thousand inhabitants

Number of new confirmed cases of COVID-19 disease in the last 7 days

Rate of change of new confirmed cases of COVID-19 disease in the last 7 days

Number of new confirmed cases of COVID-19 disease in the last 7 days per 10 thousand inhabitants

Proportion of resident population with 75 or more years old

Location coefficient

The location coefficient (LC) is obtained using the following formula:

$$LC = \left(\frac{1}{2} \sum_{j=1}^n |x_j - y_j| \right) \times 100 \quad \text{where:}$$

x_j corresponds to the ratio of the number of confirmed cases of COVID-19 in each municipality j to the number of confirmed cases of COVID-19 for the total country;

y_j corresponds to the ratio between the resident population in each municipality j and the total resident population in the country.

The Location coefficient varies between 0 and 100, with values closer to 100 reflecting greater inequality in the distribution of confirmed cases of COVID-19 against the total resident population and, in this sense, indicates situations of greater territorial concentration.

The location curve (or Lorenz concentration curve) corresponds to a graphical representation that relates the cumulative distribution of two variables. This representation also includes the straight line of equal distribution, and the greater the distance from it, the greater is the concentration of the variable represented in the ordinate axis (in this analysis, the confirmed cases of COVID-19, by period of reference) versus the variable represented in the abscissa axis (in this analysis, the total resident population).