**Population mobility study based on mobile phone data (EM-3)
July to December 2020**

A total of 67.9% of the population stayed in their area of residence on Christmas Eve 2020, compared to 51.1% in 2019

The population mobility study based on the positioning of mobile phones during the July-December 2020 period analysed the mobility of residents in Spain from June 24 through December 30, 2020.

Mobility is analysed from two perspectives:

− **Daily mobility:** two days a week, every Wednesday and Sunday from June 24 through December 30, both inclusive. Data has been published on the number of trips between areas (Spain is divided into 3,214 areas).

− **Seasonal mobility** of the resident population in Spain: taking two specific summer days (July 18 and August 15) as reference, and two specific winter days (November 22 and Christmas Day). We studied where the resident population was distributed in each of the 3,214 areas on those specific dates.

The data and maps released today show us where the resident population in Spain was located on specific days in 2020, and compare that distribution with the same dates in 2019.

It should be noted that this data reflects only the mobility of the population residing in Spain, since the original source are national dialing codes. The movements of telephones with foreign numbers, which operate on roaming in Spain, are not reflected. These phones are normally in the hands of foreign tourists.
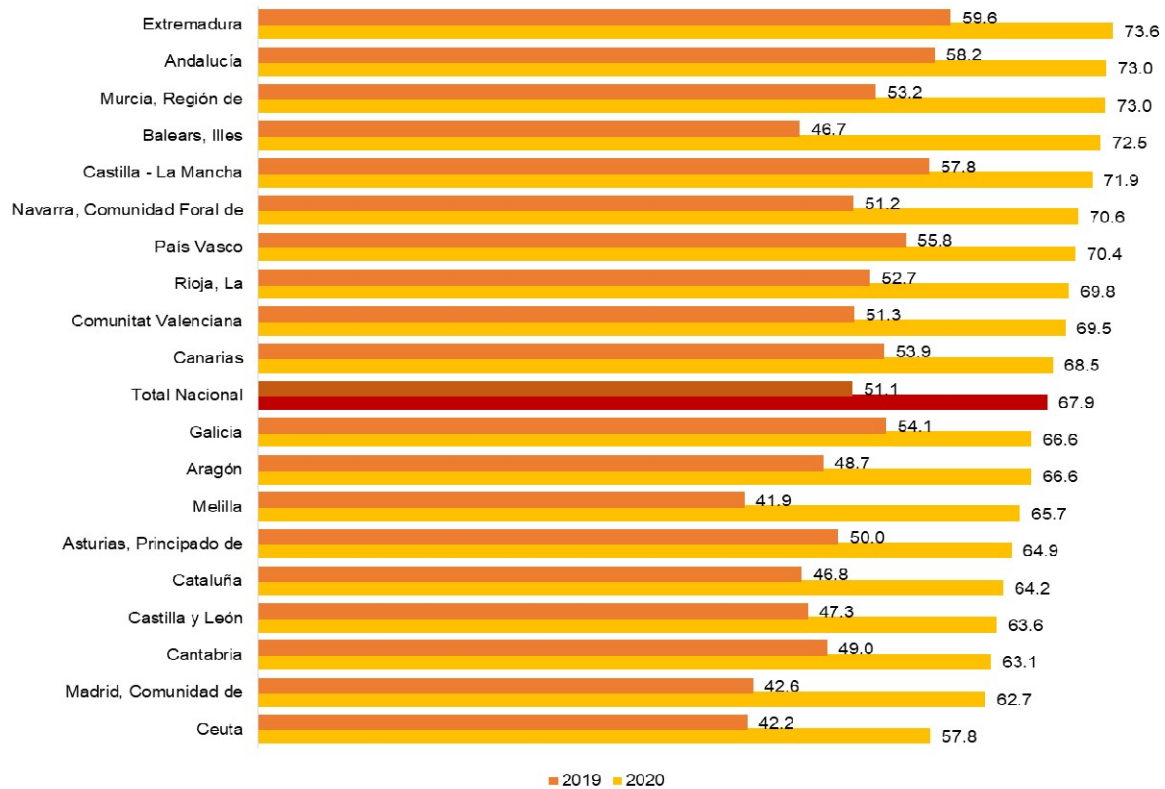
Christmas 2020

On Christmas Eve 2020 (the night of Thursday 24 to Friday 25 December) 67.9% of the population residing in Spain spent the night in their area of residence. This percentage is 16.8 points higher than on Christmas Eve 2019, when 51.1% of the people remained within their area of residence.

The autonomous city of Ceuta (57.8%) and the Comunidad de Madrid (62.7%) had the lowest percentages of population found in their habitual area of residence during the early morning of the 25th.

On the other hand, Extremadura and Andalucia registered the highest percentages of population found in their area of residence, in both cases above 73%.

Population found in their area of residence. December 25, 2019 and 2020.
Percentages

Region	2019	2020
Extremadura	59.6	73.6
Andalucía	58.2	73.0
Murcia, Región de	53.2	73.0
Balears, Illes	46.7	72.5
Castilla - La Mancha	57.8	71.9
Navarra, Comunidad Foral de	51.2	70.6
País Vasco	55.8	70.4
Rioja, La	52.7	69.8
Comunitat Valenciana	51.3	69.5
Canarias	53.9	68.5
Total Nacional	51.1	67.9
Galicia	54.1	66.6
Aragón	48.7	66.6
Melilla	41.9	65.7
Asturias, Principado de	50.0	64.9
Cataluña	46.8	64.2
Castilla y León	47.3	63.6
Cantabria	49.0	63.1
Madrid, Comunidad de	42.6	62.7
Ceuta	42.2	57.8

■ 2019 ■ 2020

At the provincial level, the highest percentages of residents who remained in their areas of residence during Christmas 2020 were Ciudad Real, Jaén and Badajoz - all with values above 75%.

Little movement and to nearby locations

The mobility study allowed us to track, with great precision, population movements between origin and destination for each of the selected dates.

If we focus on large cities, we can see the specific areas that residents go to (even at the district level).

According to the study data, there was generally little movement in the five largest cities in Spain on December 25, 2020. The population movement that took place that day was also to nearby places.

The five most frequent destinations for residents in the principal cities (December 25 2019 and 2020)

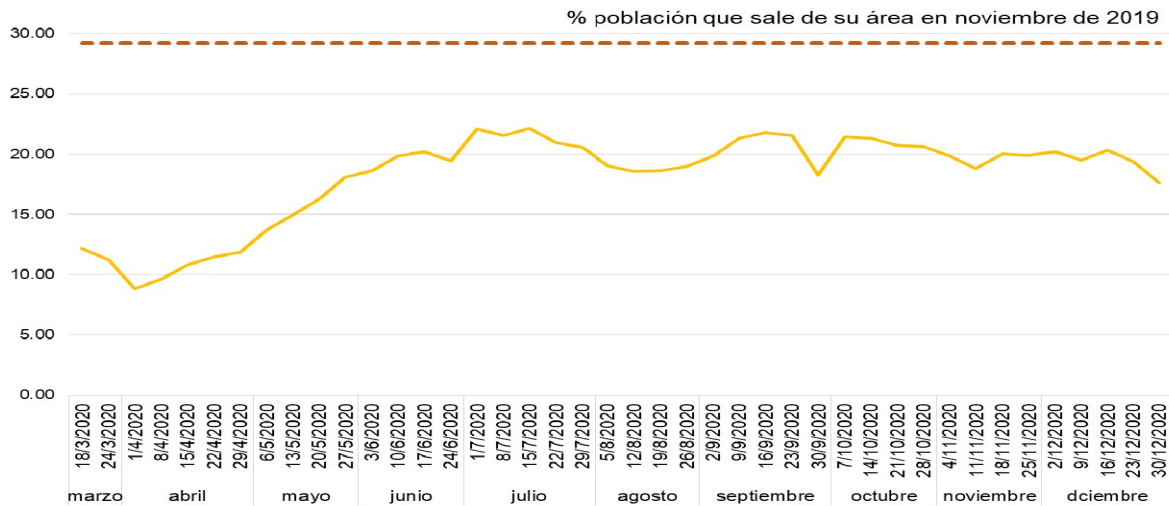| Main cities of origin	December 25, 2020		December 25, 2019	
	Main destinations	No. of people	Main destinations	No. of people
Madrid	Seseña y Casarrubios del Monte	1,273	Salamanca (distrito 01)	1,938
	Oropesa y otros municipios	1,151	Toledo (distrito 05)	1,843
	Toledo (distrito 05)	1,005	Seseña y Casarrubios del Monte	1,750
	Casar de Escalona, El y otros municipios	929	Valladolid (SCD Centro - Universidad)	1,603
	Casar, El y Uceda	898	Oropesa y otros municipios	1,567
Barcelona	Naut Aran y otros municipios	599	Calafell	797
	Calafell	595	Vendrell, El	720
	Vendrell, El	535	Girona (distrito 02)	685
	Blanes	509	Blanes	680
	Figueres	483	Lloret de Mar	636
Valencia	Dénia	830	Dénia	737
	Viver y otros municipios	521	Teruel	507
	Jávea/Xàbia	500	Segorbe	481
	Altura y otros municipios	374	Vall d'Uixó, la	404
	Segorbe	338	Almansa	386
Sevilla	Almonte	426	Almonte	668
	Santa Olalla del Cala y otros municipios	416	Córdoba (SCD Casco Histórico)	590
	Jabugo y otros municipios	401	Rota	590
	Rota	401	Huelva (distrito 01)	542
	Chiclana de la Frontera (distrito 05)	386	Santa Olalla del Cala y otros municipios	509
Zaragoza	Sádaba y otros municipios	529	Teruel	763
	Jaca	456	Albalate del Arzobispo y otros municipios	738
	Teruel	427	Soria	730
	Albalate del Arzobispo y otros municipios	424	Jaca	706
	Alcañiz	403	Sádaba y otros municipios	527

Daily mobility during the second half of 2020

The percentage of the population that moved out of their area of residence on weekdays during the central hours of the day during the second half of 2020 was much lower than that registered in 2019.

At the national level, this percentage held steady between 15 and 22% practically throughout the second half of 2020, compared to levels close to 30% in a "normal" week of 2019 (specifically the week of 18 to 21 November, which was taken as a reference).

If the percentage of the population that left their area of residence on working days is analysed throughout the second half of 2020, a downward trend can be observed from mid-October onwards, which accelerated in the final weeks of the year.

Population leaving their area of residence. March to December 2020
Percentages

INE Mobility Projects

All these data are extracted from the mobility measurement project, based on mobile phone positioning data during 2020. The work is based on aggregated data (total counts of origin-destination flows) and is fully anonymised from the country's three primary mobile phone operators.

At the end of 2019, with the aim of measuring daily and seasonal mobility on four specific dates, the INE launched a mobility study based on mobile telephony (called EM-1).

The original project was adapted during the state of alarm to measure population mobility and confinement (study EM-2), and it thus take advantage of data from mobile phone operators to obtain approximate indicators on the population that remained in their area of residence. Both studies (EM-1 and EM-2) are available on the INE website.

After the first state of alarm, the INE launched a third study to measure mobility during the second half of 2020 (called EM-3). This information has been published during the second half of the year, and the final results are published today.

The EM-3 study offers daily mobility data for every Wednesday and Sunday from June 24 to December 30, 2020, as well as for four other selected dates for the year 2020 (July 18, August 15, November 22 and December 25), thus providing a panorama of how population is distributed on different dates. All study information is available at:

https://www.ine.es/experimental/movilidad/experimental_em3.htm

The EM-4 study is in the process of being prepared. It will continue where the previous studies left off, providing data on daily mobility throughout the year 2021.

Methodological note

The main objective of this statistic is to monitor daily mobility during the second half of 2020 and to provide data on seasonal mobility for that year. Results are obtained from a positioning analysis of more than 80% of mobile phones throughout Spain, prepared in close collaboration with the three main mobile phone operators (Orange, Telefónica and Vodafone).

Statistic type: Experimental, sporadic.

Population scope: The population scope consists of the mobile phones of the resident population in Spain with service from one of three above-mentioned operators; that is, mobile phones with national dialling codes. **Foreign-numbered telephones on roaming -normally used by tourists- are excluded.** The information requested refers only to mobile phones, not to all devices that may have a SIM card. This data is later extended to population totals; we can therefore implicitly affirm that the population scope reflected is that of the population residing in Spain.

Geographical scope: the entire national territory. The national territory is divided into 3,214 specific "mobility areas" for the project, each consisting of a minimum of 5,000 inhabitants and an average of nearly 15,000 inhabitants.

The "mobility area" is a more homogeneous unit than the municipality, but less detailed than each antenna's coverage area. The complete list of mobility areas and their geographical delimitation is published together with the technical project.

Reference period: For **daily mobility** data, the most frequent position of mobile phones at night (from 10 p.m. to 6 a.m.) is analysed for a given day, to determine the area of residence. This is compared with the position in the hours from 10:00 to 16:00, which shows the destination area.

For the **seasonal mobility** data on July 18, August 15, November 22 and December 25, 2020, the area of residence is where the telephone is most frequently found over a period of two to three months (according to the operator) prior to the chosen date. This is compared with the most frequent position of the same telephone from 22:00h of the day prior to 6:00h of the day observed. Thus, for August 15, the place of overnight stay is the area where the mobile phone is most frequently located from 10 p.m. on the 14th to 6 a.m. on the 15th.

For more information the methodology can be accessed at:

https://www.ine.es/experimental/movilidad/exp_em3_proyecto.pdf

INE statistics are produced in accordance with the Code of Good Practice for European Statistics, which is the basis for the institution's quality policy and strategy. For more information see the section on Quality at INE and the Code of Best Practices on the INE website.

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Mobility study EM-3 (5/5)