Instituto Nacional de Estadística

Press Release

20 July 2020

Experimental

Population mobility study based on mobile phone data (EM-1)
Year 2019

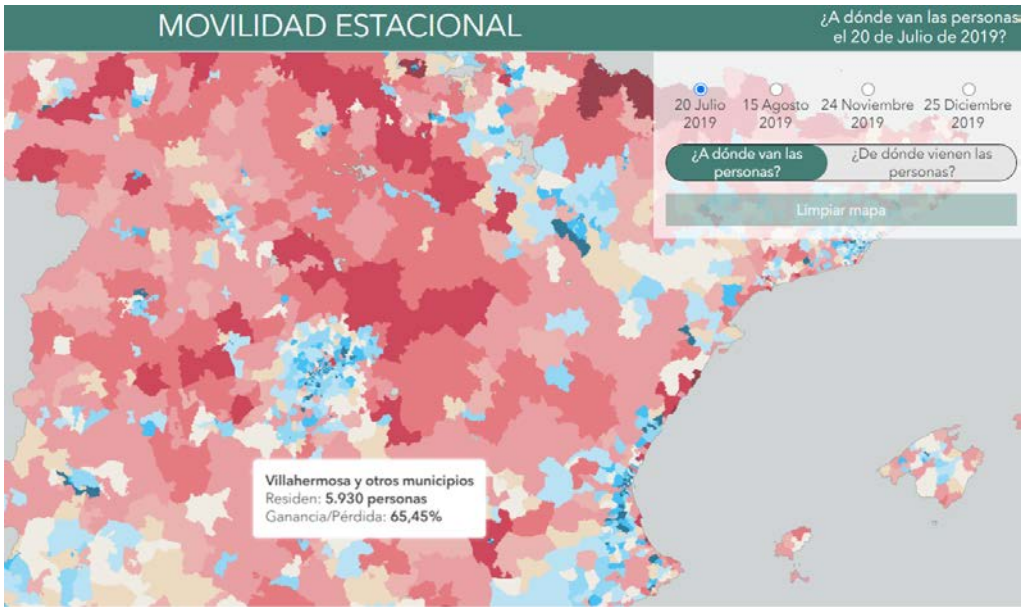
The INE has published a study using mobile phone data that analyses the Spanish population's daily and seasonal mobility

The study of population mobility using mobile phone data (EM-1), presented today by the INE, is a first attempt at studying seasonal population, taking four specific days in 2019 as reference: two in the summer, the Christmas Day, and a weekend in November. It also analyses the daily mobility of residents in Spain.

Where were we exactly a year ago?

The data and maps released today show how the population residing in Spain was distributed, on four specific days in 2019, among the 3,214 areas into which the entire territory is divided. One of these days was July 20, 2019, just a year ago.

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. Movements of foreign tourists are thus not reflected.



On July 20, 2019 the Noja area, in Cantabria, the number of residents grew from the usual 6,407 to 35,488, almost five times more. And Sallent de Gállego, in the Huesca Pyrenees, multiplied its population by more than four.

In areas such as Puerto de Santa María, Peñíscola, Oropesa del Mar, Gandía and Punta Umbría, the number of residents was between three and four times higher than the registered population.

The pattern on August 15, 2019 was very similar to that of July 20, but with a greater number people somewhere other than their usual place of residence. 550% more of the population was concentrated in Noja than usual. Many more people were also detected who had come from mountainous areas (such as Sallent de Gállego, Valle de Hecho and Alp), coastal areas (such as Oropesa del Mar, Peñiscola and Gandía) and inland areas (such as Casalarreina and Puebla de Sanabria).

Populational movements between origin and destination are known with great precision for each of the selected dates. If we focus on some of the busiest destinations, the specific areas from which vacationers arrive can be determined (even at the district level):

Most frequent places of origin for visitors to some of the main vacation destinations (July 20 and August 15, 2019)

	July 20, 2019		August 15, 2019	
Destinations	**Areas of origin**	**No. of people**	**Areas of origin**	**No. of people**
Gandía	Getafe (distrito 03)	336	Getafe (distrito 03)	423
	Dénia	318	Arganda del Rey	355
	Puertollano	267	Alcorcón (distrito 04)	316
	Leganés (distrito 04)	265	Alcorcón (distrito 02)	279
	Alcorcón (distrito 02)	264	Dénia	266
Chiclana de la Frontera	Dos Hermanas (distrito 04)	348	Pozuelo de Alarcón (distrito 01)	539
	Sevilla (SCD Number 3-A)	332	Majadahonda (distrito 02)	484
	Sevilla (SCD Number 10-B)	296	Madrid (SCD Mirasierra)	373
	Majadahonda (distrito 02)	276	Madrid (SCD Aravaca-Plantio-Valdemarin)	366
	Alcalá de Guadaíra (distrito 04)	262	Boadilla del Monte	348
Benidorm	Albacete (distrito 02)	228	Vitoria-Gasteiz (distrito 02)	633
	Arganda del Rey	181	Yecla	549
	Tomelloso	176	Vitoria-Gasteiz (distrito 05)	364
	Mieres	171	Vitoria-Gasteiz (distrito 03)	350
	Burgos (distrito 05)	165	Almansa	268
Torrevieja	Getafe (distrito 03)	396	Getafe (distrito 03)	517
	Móstoles (distrito 02)	356	Alcalá de Henares (distrito 02)	471
	Alcorcón (distrito 04)	346	Móstoles (distrito 02)	468
	Murcia (SCD Number 2-B)	337	Leganés (distrito 04)	454
	Arganda del Rey	314	Alcorcón (distrito 04)	423
Santander	Burgos (distrito 05)	355	Burgos (distrito 05)	285
	Palencia (distrito 07)	206	Madrid (SCD Hispanoamérica)	245
	Burgos (distrito 09)	164	Pozuelo de Alarcón (distrito 01)	240
	Madrid (SCD Hispanoamérica)	162	Pozuelo de Alarcón (distrito 02)	192
	Madrid (SCD Aravaca-Plantio-Valdemarin)	155	Palencia (distrito 07)	179

An exodus from the big cities

On the other hand, for areas with more than 10,000 inhabitants, in Vigo (Pontevedra) and in the provinces of Barcelona, Madrid, Murcia and Valencia, less than 20% of the resident population was present on August 15.

For the largest cities in Spain, the main summer destinations for people from Madrid were on the Levantine coast (Gandía and Denia), in Cádiz (Chiclana) and in Malaga (Marbella).

In the case of Barcelona, the most frequent destinations were places on the Catalan coast and the Pyrenees, such as Palafrugell, Platja dÁro and Calafell.

Residents of Valencia primarily chose destinations on the Levantine coast (especially Denia and Jávea); those in Seville opted for coastal areas in Cádiz and Huelva (such as Chipiona, Rota and Almonte); and those in Zaragoza headed for mountainous areas (such as Sallent de Gállego and Jaca) and the Catalan coast (Salou).

The five most frequent destinations for residents in the principal cities (July 20 and August 15, 2019)

	July 20, 2019		August 15, 2019	
Main cities of origin	**Main destinations**	**No. of people**	**Main destinations**	**Nº de personas**
Madrid	Gandia (distrito 04)	8,412	Gandia (distrito 04)	10,068
	Dénia	6,453	Dénia	9,652
	Espinar, El	4,542	Chiclana de la Frontera (distrito 05)	7,473
	San Javier	4,105	San Javier	6,933
	Oropesa del Mar/Orpesa	3,851	Marbella (distrito 03)	6,259
Barcelona	Palafrugell	6,799	Palafrugell	9,253
	Calafell	6,098	Castell-Platja d'Aro	7,509
	Castell-Platja d'Aro	5,660	Calafell	7,288
	Vendrell, El	4,847	Vendrell, El	6,184
	Blanes	3,695	Alp y otros municipios	6,032
Valencia	Dénia	3,827	Jávea/Xàbia	7,945
	Jávea/Xàbia	3,785	Dénia	6,067
	Moncofa y Chilches/Xilxes	1,988	Viver y otros municipios	3,792
	Viver y otros municipios	1,798	Landete y otros municipios	2,980
	Benicasim/Benicàssim	1,795	Moncofa y Chilches/Xilxes	2,754
Sevilla	Chipiona	13,100	Chipiona	13,987
	Almonte	12,815	Rota	13,050
	Rota	12,376	Almonte	12,614
	Lepe	9,293	Lepe	10,408
	Isla Cristina	9,041	Isla Cristina	9,406
Zaragoza	Sallent de Gállego y otros municipios	7,223	Sallent de Gállego y otros municipios	8,509
	Salou	6,371	Salou	7,154
	Cambrils y Vinyols i els Arcs	5,238	Jaca	5,968
	Peníscola/Peñíscola	5,067	Cambrils y Vinyols i els Arcs	5,648
	Jaca	4,241	Peníscola/Peñíscola	5,387

Full and empty provinces and areas

While no tourist destination stood out much more than any other, the province of Ávila had the highest growth in population for July 20, with an increase of 36% (with the increases in Navaluenga and Barco de Ávila being of particular note). Huesca was close behind, with a population growth of 31%. Following this was the tourist destination Huelva, where a 29% increase was registered.

On the other hand, some provinces had much less population than that registered a year. ago In Vizcaya, only 76% of the usual resident population was present on July 20, 2019. For Comunidad de Madrid the number was 81% and for the province of Sevilla, 82%.

Some urban areas were practically empty. In Sant Boi de Llobregat, Córdoba and Alcoy some areas had less than 25% of their normal population.

A weekend in November

The study also analyses a Saturday to Sunday night, November 23th and 24th of 2019; that is, on a “valley” weekend.

In this case, the percentages of people who left their usual places of residence were lower than those recorded in the summer. The historical centres of cities like Madrid, Sevilla, Valladolid, Vigo and Córdoba received large numbers of people.

On the other hand, in areas of Barcelona, Santa Cruz de Tenerife, Las Palmas de Gran Canaria and Oviedo, less than 30% of residents were present.

Christmas 2019

The last date analysed to estimate seasonal population was the night of December 24 to 25, 2019. Some city centres, such as those in Salamanca, Córdoba, Valladolid, and Barcelona, at least doubled their normal resident population during Christmas.

On the other hand, the population of other areas, likewise urban but not central, considerably decreased their population on the night of the 24th.

Daily Mobility

During a normal working day (taking November 2019 as a reference) 29.2% of the population left their area of residence during daytime hours, probably to work or study in a different area.

This percentage was higher than 70% in some city neighbourhoods, including Palencia (76%), Córdoba (75%) and Alcoy/Alcoi (73%).

On the other hand, daily mobility barely reached 6% in areas of Yecla (Region of Murcia), Teruel, and Lucena (Córdoba).

The areas that received the largest daily population influx in November 2019 were Comunidad de Madrid (Alcobendas and Ciudad Universitaria), with inflows of over 40,000 people. Likewise for Barcelona (the Marina, the Zona Franca-Port, the Dreta de l'Eixample sud) and Valencia (Ciutat Vella) all with more than 30,000 people. The 7th district of Elche, where the airport is located, also received a large number of people.

Day and Night Population

Mobile phone positioning makes it possible to detect where population increased the most, and at what time.

Taking as a reference population for each area present at 8:00 pm, areas such as Pedralbes in Barcelona, the University City in Madrid and the 1st district of Cartagena doubled their population during daytime hours.

On the other hand, the population observed during the night decreased in practically all areas compared to that observed at 8:00 p.m., partly explained by mobile phones being turned off.

INE Mobility Projects

All data was extracted from the INE mobility measurement project, based on mobile phone positioning data and launched in late 2019 with the specific objective of measuring daily mobility (residence-work).

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.

The original project was modified during the state of alarm to measure populational mobility and confinement. Operator data made possible to gather approximate indicators for the population that remained in the area of their residence. The mobility study during the state of alarm (entitled EM-2) is available on the INE website.

Once the state of alarm came to an end, the INE resumed the original project (renamed the EM-1 mobility study) which is published today. The mobility data given is for the work week from November 18 to 21 (Monday to Thursday) as well as for four other selected dates for the year 2019 (July 20, August 15, November 24 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_em.htm

The study will be completed with a third mobility project (EM-3) during the return to normality, which will track evolution during the second half of 2020.

Methodological note

The main objective of this pilot statistic is to evaluate the suitability of mobile phone positioning information for use as an alternative to the traditional population census method in providing daily and seasonal mobility data.

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 (sections 1 and 2 of the tables), on November 18 to 21, 2019. For seasonal mobility data (section 3 of the tables), on July 20, August 15, November 24, and December 25, 2019. More specifically, the most frequent position of a mobile phone between the hours of 10pm and 6am is analysed. In the case of August 15, the area where the mobile phone is most frequently located from 10pm at night on day 14 to 6am in the morning on day 15 is taken as reference.

For more information you can access the methodology at:

https://www.ine.es/experimental/movilidad/exp_em1_proyecto.pdf