experimental

Population mobility study based on mobile phone data (EM-4)

On July 15, 2020, the maximum daily mobility was reached since the start of the pandemic, with 22% of people leaving their area of residence

Only 10% moved from their area in early January 2021, with the third wave of COVID-19 and the storm Filomena

Today, INE is resuming publication of population mobility studies based on the positioning of mobile phones, with data that will be updated every week.

Mobility will be analysed from two perspectives:

-   **Daily mobility:** two days a week, every Wednesday and Sunday from January 3 to December 29, 2021, both inclusive. Data published today covers though May 26. Data on the number of trips between areas is published (Spain is divided into 3,214 areas).

-   **Seasonal mobility** of the resident population in Spain: taking two specific summer days (July 17 and August 15) as reference, and two specific winter days (November 21 and Christmas Day). The location of the resident population in each of the 3,214 areas on those specific dates will be studied, and this can be compared with the situation in 2019 (prior to the COVID-19 outbreak) and in 2020.

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.

Daily mobility in 2020 and 2021

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.
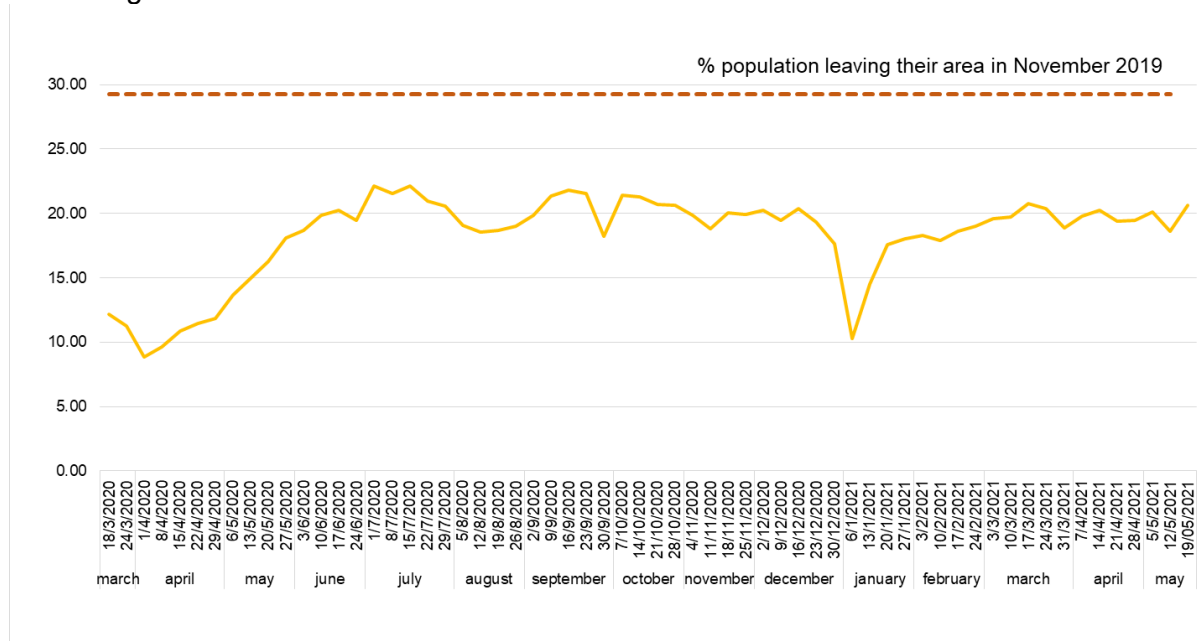
At the national level, this percentage held steady around 20% practically throughout the second half of 2020, compared to levels close to 30% in a "normal" week of 2019 (specifically the week of 18 to 21 November, which was taken as a reference). The maximum of daily mobility was reached on July 15, 2020, with 22%.

In mid-October, a downward trend in mobility was observed, which accelerated in the final weeks of 2020 and the first weeks of 2021.

At the beginning of January 2021, only 10% of the population left their area of residence on business days, coinciding with the third wave of the pandemic and the Filomena storm. This percentage began to grow from the middle of that month onwards, reaching levels of 20% as of April.

Population leaving their area of residence. March to May 2021
Percentages

INE Mobility Projects

All these data are extracted from the mobility measurement project, based on mobile phone positioning data. 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 its first mobility study (called EM-1).

This project was adapted during the state of alarm to measure population mobility and confinement (EM-2), to obtain approximate indicators on the population that remained in their area of residence. After the first state of alarm, a third study was launched to measure mobility in the second half of 2020 (EM-3).

The study published today (EM-4) takes up the weekly data series from where the previous one left off, and will offer daily mobility data for all of 2021. Likewise, data will be gather for four other selected dates for the year 2021 (July 17, August 15, November 21 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_em4.htm

Methodological note

The main objective of this statistic is to monitor daily mobility during the COVID-19 pandemic. 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 a.m. to 4:00 p.m., which shows the destination area.

For the **seasonal mobility** data on July 17, August 15, November 21 and December 25, 2021, 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_em_proyecto.pdf

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