

Article

# International migration research, progress update: November 2023

An update on international migration methods and research.

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# 1 . Overview of migration statistics transformation

This article provides an update on research to develop admin-based migration estimates (ABMEs) and expand the range and granularity of our statistics. For detailed information on our current methods and quality, please refer to our [Methods to produce provisional long-term international migration estimates article](#).

We have introduced a number of improvements to the international migration estimates presented in our [Long-term international migration, year ending June 2023 bulletin](#), published 23 November 2023.

We are also supporting research on a Dynamic Population Model (DPM) to develop timely and coherent migration and population estimates at a national and local authority level. For the most recent publication, please see our [Dynamic population model, improvements to data sources and methodology for local authorities, England and Wales: 2021 to 2022 article](#).

## 2 . Improvements to methods for non-EU migration using Home Office data

Home Office Borders and Immigration data (including visa information and travel data) are currently our best administrative source for estimating non-EU immigration and emigration. We have made a small improvement to our method for travel not matched to a visa and several improvements to the assumptions behind our adjustments used to create provisional estimates of non-EU migration. For more information on the latest methodology, our [Methods to produce provisional long-term international migration estimates methodology](#) is available.

### Method improvement for travel not matched to a visa

Some individuals within the Home Office Borders and Immigration data have travel information that has not been matched to a visa. This could be because they are non-visa nationals so do not require a visa to come to the UK (and will typically be short-term visits). It may also be the system has not matched the travel and visa information. We have done further work on this group, making sure those who have visa information are linked in our system and included in the estimates of long-term migration. We have continued to remove those who should not be included, including those with short visits not requiring a visa.

### Assumptions to produce provisional estimates of migration

To produce timely estimates of long-term migration for the year ending (YE) June 2023 and December 2022, we use assumptions about people's expected length of stay or departure. This means we have greater uncertainty in these provisional estimates and will update them as we gather a full 12 months of travel data to confirm people's long-term migration status, at which point uncertainty around the estimates reduces. We are seeing behaviours change, with more people staying long term than during the coronavirus (COVID-19) pandemic.

Therefore, to account for the change in behaviour, we have updated our assumptions for the YE June 2023 estimates. Because of these changing behaviours, we want to further strengthen how assumptions are set. While the detail of this process is still being defined, for our next release in May 2024, we are hoping to supplement historical evidence used in our current assumptions with "on-the-ground" expert insight, particularly from policy areas, so that any observed behavioural changes not yet identified in historic data are accounted for.

## Immigration early leaver adjustment

For individuals whose first arrival occurred within the 12 months before the end of the reference period (currently June 2023), we do not yet have enough information to see a stay of at least 12 months as not enough time has passed. Therefore, we use past behaviour to estimate how many people arriving on long-term visas will stay in the UK for over a year and how many people will leave before staying a year. This is known as an early leaver adjustment.

The early leaver adjustment is challenging to implement when behaviours are changing. Using international students as an example, the extent to which students left the UK early has changed significantly since 2021 compared with the period before. This will reflect different factors affecting student behaviours over this time, such as the pandemic, student dependents coming to the UK long term, and the introduction of the new Graduate visa scheme.

The early leavers adjustment is applied by reason for migration as our research has shown that different groups exhibit different behaviours. Using study and work as examples, our assumption for data published in May 2023 were based on data for YE December periods 2018, 2019 and 2020.

We have improved our assumptions to give more weight to recent data that are likely to better reflect future trends. For estimates published in November 2023, we avoided using data that were affected by the pandemic, and therefore included YE June 2019 and YE June 2022. We have double weighted YE June 2022 as this is most likely to reflect future trends.

The proportion of total long-term study arrivals who did not stay for at least 12 months in the:

- YE December 2018 was 18%
- YE June 2019 was 21%
- YE December 2019 was 34%
- YE June 2020 was 32%
- YE December 2020 was 20%
- YE June 2021 was 21%
- YE December 2021 was 4%
- YE June 2022 was 14%

Our previous assumption used in estimates published in May 2023 was based on the YE December 2018, 2019, and 2020, which estimated an average of 24% of study arrivals did not become long-term. Our improved assumption used in estimates published in November 2023 is based on the YE June 2019 and 2022 (double weighted), which estimated an average of 16% of study arrivals did not become long term.

The proportion of total long-term work arrivals who did not stay for at least 12 months in the:

- YE December 2018 was 17%
- YE June 2019 was 19%
- YE December 2019 was 17%
- YE June 2020 was 16%
- YE December 2020 was 8%
- YE June 2021 was 4%
- YE December 2021 was 2%
- YE June 2022 was 3%

Our previous assumption used in estimates published in May 2023 was based on the YE December 2018, 2019 and 2020, which estimated an average of 14% of work arrivals did not become long term. Our improved assumption used in estimates published in November 2023 is based on the YE June 2019 and 2022 (double weighted), which estimated an average of 8% of work arrivals did not become long term.

In previous iterations, we applied 100% of the adjustment to the most recent year ending period, and applied proportionally back 75%, 50% and 25% to the remaining three-year end periods. We have now applied this adjustment to immigration in individual quarters to reflect that arrivals are not constant throughout the year. For example, there were 1 million arrivals on long-term visas in the YE December 2022. Previously, we would have applied the adjustment to 50% of the total arrivals (covering the second half of the year, where we do not have complete travel information). 64% of arrivals occurred between June and December 2022, so we have applied the adjustment to this group.

## Emigration rearrivals adjustment

We do not currently have enough data to see whether an individual, who is observed to have departed the UK, will become a long-term emigrant, or subsequently return within the next 12 months, and therefore should not be classified as a long-term emigrant. This could happen if someone were to go abroad on holiday towards the end of their current visa but return and switch to a new visa.

Similarly to the early leavers adjustment, we use historical data to estimate how many departees in a reference period subsequently return within 12 months. We have improved this assumption to be consistent with updates applied to the early leavers adjustment.

Our previous assumption was based on YE December 2018, 2019, and 2020 data and avoided YE December 2021 data, where travel was impacted by the pandemic. This assumption assumed around 2% of people who were observed departing in the most recent reference period would not become long-term emigrants.

As we now have more data covering the post-pandemic era, which shows that behaviours have changed, we have improved our assumptions to use YE June 2019 and 2022 double weighted (as per the early leavers adjustment). This has changed the adjustment from 2% to 3%.

## Early exits adjustment

We continue to adjust our emigration estimates to include individuals who have been absent for 52 weeks or more, and whose emigration has not been identified because the visa period is still valid. For more information about the emigration early exits adjustment see our previous [International migration research, progress update: May 2023 article](#).

We have now applied the early exits adjustment to our immigration estimates to ensure those identified as having an early exit (left the UK for 12 months or more with no rearrival) and no longer having a length of stay of more than 365 days are not included in immigration estimates.

## Emigration visa transitions adjustment

Our previous methodology counted people as an emigrant at the end of their visa unless we saw evidence of travel on a new visa. Over the pandemic, higher proportions of students travelled on their visas (returning home) and lower proportions transitioned to a new visa. For more information on international students research, see our [Reason for international migration, international students update: November 2023 article](#).

We have seen an increase in those who have extended their visas and moved onto new visas to stay in the UK, including the Graduate visa. However, they did not travel on their new visa. This revealed the need to link visa data together to better understand when people update their visa. We will continue to improve our methodology for the next publication in May 2024. However, we have applied an adjustment to the YE June 2021 to YE June 2023 estimates published in November 2023.

## Asylum seekers and settled refugees

We have used data from the Home Office to add the total number of asylum applicants to the international migration estimate. For assumptions related to this work, refer to our [Methods to produce provisional long-term international migration estimates article](#).

To avoid double counting, we removed asylum seekers who had previously entered on a visa and applied for asylum before the end of their visa. Approximately 6,000 applicants were removed from the asylum data as they will be classified as long-term international migrants (LTIM) as part of their visa. We also linked the asylum applications data to asylum returns data to remove applicants who returned within one year of raising their application. This was approximately 1,000 applicants in the YE June 2023. No adjustment has been applied in the last four quarters of data to account for returns that have not yet occurred within a year.

Finally, we identified records in the Home Office Borders and Immigration data for those with a visa expiring after their application was raised to ensure that they are not included in the non-EU emigration estimates.

Table 1: Impact of adjustments on YE June 2023 immigration estimates

|                                     |                                                                                                 |          |
|-------------------------------------|-------------------------------------------------------------------------------------------------|----------|
| <b>Total arrivals</b>               | <b>1,080,000</b>                                                                                |          |
|                                     | Immigration early leavers                                                                       | -100,000 |
|                                     | Immigration early leavers British Nationals (Overseas) (BN(O)) and Ukraine Schemes              | -7,000   |
| <b>Adjustments</b>                  | Immigration arriving on a Long-term international migration (LTIM) visa and applying for asylum | -6,000   |
| <b>Non-EU long-term immigration</b> | 968,000                                                                                         |          |

Source: Home Office Borders and Immigration data from the Home Office

### Notes

1. For more information on the immigration early leavers for British Nationals (Overseas) (BN(O)) and Ukraine schemes our [Methods to produce provisional long-term international migration estimates article](#) is available.
2. Numbers have been rounded to the nearest thousand. Totals may not equal the sum of individual numbers.

Table 2: Impact of adjustments on YE June 2023 emigration estimates

|                                    |                                     |
|------------------------------------|-------------------------------------|
| <b>Total departures</b>            | <b>268,000</b>                      |
|                                    | Emigration rearrivals -7,000        |
| <b>Adjustments</b>                 | Emigration early exits +16,000      |
|                                    | Emigration visa transitions -78,000 |
| <b>Non-EU long-term emigration</b> | 200,000                             |

Source: Home Office Borders and Immigration data from the Home Office

#### Notes

1. Numbers have been rounded to the nearest thousand. Totals may not equal the sum of individual numbers.

## 3 . Impact of revisions to provisional estimates of migration

Estimates published in May 2023 for the periods year ending (YE) June 2022 and YE December 2022 were provisional and provided an early indication of international migration during this time. We have updated (revised) these estimates now that we have more data to confirm people’s long-term migration status. Further details on revisions can be found in our [Revisions policy](#).

We have revised estimates for the YE June 2021 to YE December 2022 that were published in May 2023. The size and reasons for the revisions are shown in the following tables. The improvements to our estimates mean that for the YE December 2022, our net migration estimates are revised upwards by 139,000 to 745,000.

## Revisions to non-EU immigration

Table 3: Impact of revisions on non-EU immigration

| Improvement                                                                                                    | YE June 2021 | YE December 2021 | YE June 2022 | YE December 2022 |
|----------------------------------------------------------------------------------------------------------------|--------------|------------------|--------------|------------------|
| <b>Method improvement: implementing early exits adjustment to immigration</b>                                  | -4,000       | -8,000           | -15,000      | -9,000           |
| <b>Method improvement: Asylum /resettlement</b>                                                                | +2,000       | +2,000           | +8,000       | +16,000          |
| <b>Method improvement: including unmatched leave</b>                                                           | +2,000       | +6,000           | +9,000       | +11,000          |
| <b>Early leavers adjustment: improved assumptions and having complete travel data for January to June 2022</b> | +5,000       | -25,000          | +33,000      | +90,000          |
| <b>Ukraine/BNO adjustment: having complete travel data for January to June 2022</b>                            | N/A          | N/A              | +5,000       | -2,000           |
| <b>Total revision to Non-EU immigration</b>                                                                    | +5,000       | -27,000          | +40,000      | +105,000         |

Source: Home Office Borders and Immigration data from the Home Office

### Notes

1. Numbers have been rounded to the nearest thousand. Totals may not equal the sum of individual numbers.

The revision to the immigration of non-EU nationals in the YE December 2022 is driven by two main factors.

Firstly, when we published in May 2023, we did not have complete data to say whether those who arrived would stay long term for the YE December 2022 period. For those who arrived between January and June 2022, we now have 12 months of travel data to say whether they subsequently stayed long term. However, for those who arrived between July and December 2022, we still rely on an adjustment to estimate how many will stay long term.

We have also made an improvement to our method for estimating migration where we do not have complete data (called our early leavers adjustment), along with improved data to feed into these assumptions. More information on these improvements is available in [Section 2: Improvements to methods for non-EU migration using Home Office data](#). This means for the period July to December 2022, we are using these improved assumptions to inform how many people we believe are staying long term.

We have revised our estimate up by 90,000 for these reasons for the YE December 2022. For our Ukraine and British Nationals (Overseas) (BN(O)) adjustment, we also no longer rely on assumptions for the period January to June 2022. This is because we now have complete data and have revised our estimate down by 2,000 for the YE December 2022.

We have also made some small method improvements. These include an improvement to how we estimate asylum and resettlement, implementing the early exits adjustment to immigration, as well as an improvement to unmatched leave. We have revised our estimate of immigration for the YE December 2022 up by 18,000 for these reasons.

## Revisions to non-EU emigration

Table 4: Impact of revisions on non-EU emigration

| Improvement                                                                                                             | YE June 2021   | YE December 2021 | YE June 2022   | YE December 2022 |
|-------------------------------------------------------------------------------------------------------------------------|----------------|------------------|----------------|------------------|
| <b>Method improvement: visa transitions and updated data to June 2023</b>                                               | -12,000        | -23,000          | -40,000        | -103,000         |
| <b>Method improvement: Asylum /resettlement</b>                                                                         | 0              | 0                | -1,000         | -1,000           |
| <b>Method improvement: including unmatched leave</b>                                                                    | 0              | 0                | 0              | +500             |
| <b>Emigration re-arrivals adjustment: improved assumptions and having complete travel data for January to June 2022</b> | N/A            | N/A              | N/A            | -1,000           |
| <b>Total revision to Non-EU emigration</b>                                                                              | <b>-14,000</b> | <b>-25,000</b>   | <b>-42,000</b> | <b>-106,000</b>  |

Source: Home Office Borders and Immigration data from the Home Office

### Notes

1. Numbers have been rounded to the nearest thousand. Totals may not equal the sum of individual numbers.

There are three reasons why we have revised estimates of non-EU emigration for the YE December 2022.

Firstly, we updated our method that counted people as an emigrant at the end of their visa unless we saw evidence of travel on a new visa ([Section 2: Improvements to methods for non-EU migration using Home Office data](#)). This also includes those who left between January and June 2022, where we now have completed travel information to show whether they moved onto another visa or remained out of the UK. For the YE December 2022, this has decreased emigration by 103,000.

We have also made a small improvement to how we estimate asylum and resettlement, and made an improvement to unmatched leave. We have revised our estimate of emigration for the YE December 2022 down by 1,500 for these reasons.

Finally, we have made an improvement to our method for estimating emigration where we do not have complete data to say whether someone returned to the UK (called our emigration re-arrivals adjustment), along with improved data to feed into these assumptions. We have revised our estimate of emigration for the YE December 2022 down by around 1,000 for this reason.

## Revisions to EU immigration

Table 5: Impact of revisions on EU immigration

| EU immigration revisions                | YE June 2021 | YE December 2021 | YE June 2022 | YE December 2022 |
|-----------------------------------------|--------------|------------------|--------------|------------------|
| <b>Updated data to March 2023</b>       | +57,000      | -24,000          | -71,000      | -35,000          |
| <b>Total revision to EU immigration</b> | +57,000      | -24,000          | -71,000      | -35,000          |

Source: Registration and Population Interactions Database from the Department for Work and Pensions

The revision to the immigration of EU nationals in the YE December 2022 is driven by data moving from provisional to updated. There are two reasons for this.

**Figure 1: Example of producing provisional estimates of immigration from RAPID and how updated data are incorporated**

Quarter 2 2020 to Quarter 2 2023

| May 2023 publication                         |                                                                                                                  |         |         |         |                                                                                                                   |         |         |         | Year ending December 2022                     |         |         |  |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------|---------|---------|-------------------------------------------------------------------------------------------------------------------|---------|---------|---------|-----------------------------------------------|---------|---------|--|
|                                              | Q2 2020                                                                                                          | Q3 2020 | Q4 2020 | Q1 2021 | Q2 2021                                                                                                           | Q3 2021 | Q4 2021 | Q1 2022 | Q2 2022                                       | Q3 2022 | Q4 2022 |  |
| Data source                                  | RAPID Tax year 2020-21                                                                                           |         |         |         | RAPID Tax year 2021-22                                                                                            |         |         |         | Use IPS to inform the trend                   |         |         |  |
| Length of activity in data source            | Incomplete long-term activity                                                                                    |         |         |         | No long-term activity                                                                                             |         |         |         | Temporal disaggregation to forecast estimates |         |         |  |
| Adjustments to produce provisional estimates | Adjust for 3% of arrivals who have not yet registered for a NINo<br>Adjust for arrived but no long-term activity |         |         |         | Adjust for 20% of arrivals who have not yet registered for a NINo<br>Adjust for arrived but no long-term activity |         |         |         |                                               |         |         |  |

| November 2023 publication                    |                             |         |         |         |                                                                                                                  |         |         |         |                                                                                                                   |         |         |         | Year ending December 2022                     |  |
|----------------------------------------------|-----------------------------|---------|---------|---------|------------------------------------------------------------------------------------------------------------------|---------|---------|---------|-------------------------------------------------------------------------------------------------------------------|---------|---------|---------|-----------------------------------------------|--|
|                                              | Q2 2020                     | Q3 2020 | Q4 2020 | Q1 2021 | Q2 2021                                                                                                          | Q3 2021 | Q4 2021 | Q1 2022 | Q2 2022                                                                                                           | Q3 2022 | Q4 2022 | Q1 2023 | Q2 2023                                       |  |
| Data source                                  | RAPID Tax year 2020-21      |         |         |         | RAPID Tax year 2021-22                                                                                           |         |         |         | RAPID Tax year 2022-23                                                                                            |         |         |         | Use IPS to inform the trend                   |  |
| Length of activity in data source            | Complete long-term activity |         |         |         | Incomplete long-term activity                                                                                    |         |         |         | No long-term activity                                                                                             |         |         |         | Temporal disaggregation to forecast estimates |  |
| Adjustments to produce provisional estimates | No adjustments              |         |         |         | Adjust for 3% of arrivals who have not yet registered for a NINo<br>Adjust for arrived but no long-term activity |         |         |         | Adjust for 20% of arrivals who have not yet registered for a NINo<br>Adjust for arrived but no long-term activity |         |         |         |                                               |  |

Source: Registration and Population Interactions Database from the Department for Work and Pensions

Firstly, estimates of EU migration are based on the Registration and Population Interaction Database (RAPID) (see [Section 9: Glossary](#)), an annual tax year dataset. When we published initial estimates for the YE December 2022, we had RAPID data up to the 2021 to 2022 tax year, containing record level data to April 2022. To estimate immigration between April 2022 and December 2022, we relied on data from the International Passenger Survey (IPS) to forecast expected immigration. In July 2023, we received the 2022 to 2023 tax year data, containing record level data up to April 2023. Therefore, we now have better information to inform immigration in the year ending December 2022.

Secondly, for arrivals between January and April 2022, we previously only had up to three months of activity to show whether those who arrived stayed long term. In our latest record level data, up to April 2023, we have 12 months of activity for arrivals between January and April 2022. For the period April to December 2022, we now have information to show the number of arrivals during this period. However, we use an adjustment informed by historic behaviour to estimate how many of these will stay long term.

We have revised our estimate of immigration for the YE December 2022 down by 35,000 for these reasons.



## Revisions to EU emigration

Table 6: Impact of revisions on EU emigration

| EU emigration revisions                | YE June 2021   | YE December 2021 | YE June 2022   | YE December 2022 |
|----------------------------------------|----------------|------------------|----------------|------------------|
| Updated data to March 2023             | +13,000        | -4,000           | +10,000        | +37,000          |
| <b>Total revision to EU emigration</b> | <b>+13,000</b> | <b>-4,000</b>    | <b>+10,000</b> | <b>+37,000</b>   |

Source: Registration and Population Interactions Database from the Department for Work and Pensions

The revision to the emigration of EU nationals in the YE December 2022 is driven by the data moving from provisional to updated. There are two reasons for this.

### Figure 2: Example of producing provisional estimates of emigration from RAPID and how updated data are incorporated

#### Quarter 2 2020 to Quarter 2 2023

| May 2023 publication                         |                             |         |         |         |                                                                               |         |         |         |                                               | Year ending December 2022 |         |  |  |
|----------------------------------------------|-----------------------------|---------|---------|---------|-------------------------------------------------------------------------------|---------|---------|---------|-----------------------------------------------|---------------------------|---------|--|--|
|                                              | Q2 2020                     | Q3 2020 | Q4 2020 | Q1 2021 | Q2 2021                                                                       | Q3 2021 | Q4 2021 | Q1 2022 | Q2 2022                                       | Q3 2022                   | Q4 2022 |  |  |
| Data source                                  | RAPID Tax year 2020-21      |         |         |         | RAPID Tax year 2021-22                                                        |         |         |         | Use IPS to inform the trend                   |                           |         |  |  |
| Length of activity in data source            | Complete long-term activity |         |         |         | No long-term activity                                                         |         |         |         | Temporal disaggregation to forecast estimates |                           |         |  |  |
| Adjustments to produce provisional estimates | No adjustments              |         |         |         | Adjust for those who have left but do not have a whole tax year of inactivity |         |         |         |                                               |                           |         |  |  |

| November 2023 publication                    |                             |         |         |         |                             |         |         |         |                                                                               |         |         |         | Year ending December 2022                     |  |  |
|----------------------------------------------|-----------------------------|---------|---------|---------|-----------------------------|---------|---------|---------|-------------------------------------------------------------------------------|---------|---------|---------|-----------------------------------------------|--|--|
|                                              | Q2 2020                     | Q3 2020 | Q4 2020 | Q1 2021 | Q2 2021                     | Q3 2021 | Q4 2021 | Q1 2022 | Q2 2022                                                                       | Q3 2022 | Q4 2022 | Q1 2023 | Q2 2023                                       |  |  |
| Data source                                  | RAPID Tax year 2020-21      |         |         |         | RAPID Tax year 2021-22      |         |         |         | RAPID Tax year 2022-23                                                        |         |         |         | Use IPS to inform the trend                   |  |  |
| Length of activity in data source            | Complete long-term activity |         |         |         | Complete long-term activity |         |         |         | No long-term activity                                                         |         |         |         | Temporal disaggregation to forecast estimates |  |  |
| Adjustments to produce provisional estimates | No adjustments              |         |         |         | No adjustments              |         |         |         | Adjust for those who have left but do not have a whole tax year of inactivity |         |         |         |                                               |  |  |

Source: Registration and Population Interactions Database from the Department for Work and Pensions

Firstly, estimates of EU migration are based on RAPID data. When we published initial estimates for the YE December 2022, we had RAPID data available up to the 2021 to 2022 tax year. This contained record level data up to April 2022. Between April 2022 and December 2022, we relied on data from the IPS to forecast expected emigration. In July 2023, we received the 2022 to 2023 RAPID data, which contains record level data up to April 2023. Therefore, we now have better information to inform emigration in the year ending December 2022.

Secondly, estimates of EU emigration rely on having 12 months of inactivity to imply an emigration. Therefore, for the estimates published in May 2023, the YE March 2021 is the final year we could estimate EU emigration for by identifying those who have ceased interacting with the source systems. For the most recent tax year (2021 to 2022), we applied an adjustment, using historic patterns of behaviour to inform the proportion of people we expect to emigrate. We now have record level data up to April 2022. This allows us to estimate emigration for 2021 to 2022 and we now apply an adjustment to inform the number of people we expect to emigrate in 2022 to 2023.

We have revised our estimate of emigration for the YE December 2022 up by 37,000 for this reason.

## Revisions to British immigration and emigration

Table 7: Impact of revisions on British immigration and emigration

| British revisions                              | YE June 2021 | YE December 2021 | YE June 2022 | YE December 2022 |
|------------------------------------------------|--------------|------------------|--------------|------------------|
| <b>Immigration</b>                             |              |                  |              |                  |
| <b>Revision due to rebasing to Census 2021</b> | -5,000       | N/A              | N/A          | N/A              |
| <b>Emigration</b>                              |              |                  |              |                  |
| <b>Revision due to rebasing to Census 2021</b> | +69,000      | N/A              | N/A          | N/A              |

Source: International Passenger Survey from the Office for National Statistics

Migration estimates for British nationals are based on the IPS and we have not revised the estimates for the YE December 2021 onwards. For more information on revisions to estimates of migration for British nationals between 2012 and 2021 our [Estimating UK international migration: 2012 to 2021 article](#) is available.

## 4 . Measuring uncertainty in estimates of long-term international migration

All statistics have uncertainty or error. This is because of how the data used to produce them have been collected. The underlying concept they are trying to measure is also often latent (not directly observed). This total error is defined as the difference between the estimate produced, and the underlying “true” value you would measure if you had a complete, true, dataset. Uncertainty intervals attempt to measure and quantify the error.

Total error is made up of sampling error, non-sampling error, and conceptual error. There are established, well-understood methods for producing error for survey-based estimates, which primarily reflects sampling error. Producing uncertainty intervals for administrative data-based estimates is more complex. Administrative data-based statistics do not have the same setup as a survey, the data are not a sample, and they are the product of a process. To estimate uncertainty, there is no sampling error to quantify, only non-sampling error (such as coverage, process, and respondent). These are independent of the size of the dataset. They may not diminish over time or with new information. The methods to quantify non-sampling error are not established like the methods we have for understanding sampling error in surveys.

We have developed innovative methods to quantify non-sampling error associated with several components of the admin-based migration estimates (ABME) process. This has focused on the uncertainty introduced by the assumptions used to produce timely provisional estimates of migration, including the adjustments made to estimates of non-EU migration and EU migration. In addition, we have included uncertainty for survey-based estimates for British nationals, using International Passenger Survey (IPS) data.

We have used a [simulation-based approach](#) to quantify uncertainty in individual areas of the ABME process and bring these elements together to create a composite measure of uncertainty for net migration, immigration and emigration.

These measures of uncertainty do not yet account for error in the source administrative data such as the [coverage, measurement and processing errors in administrative data](#). The current uncertainty intervals are incomplete and without quantifying the error in administrative data, they most likely underestimate uncertainty. However, the confidence intervals presented alongside our historic estimates of international migration were also not a complete measure of uncertainty. The [IPS based confidence intervals](#) included sampling error but did not account for non-sampling error such as non-response bias or measurement error.

We have presented these uncertainty intervals in our [Long-term international migration, provisional: year ending June 2023 bulletin](#). These define a plausible range, including associated probabilities, where the true value of international migration is likely to lie if our simulations accurately included all the main sources of uncertainty. As we have not yet included all sources of uncertainty, these intervals should be interpreted with caution and only represent a partial measure of uncertainty with ABME.

The methods being developed to estimate uncertainty have been quality assured by the [Methodology Assurance Review Panel](#). A full update on the creation of the uncertainty intervals and next steps will be published in the coming months.

## 5 . Developing methods for EU visa holders using Home Office data

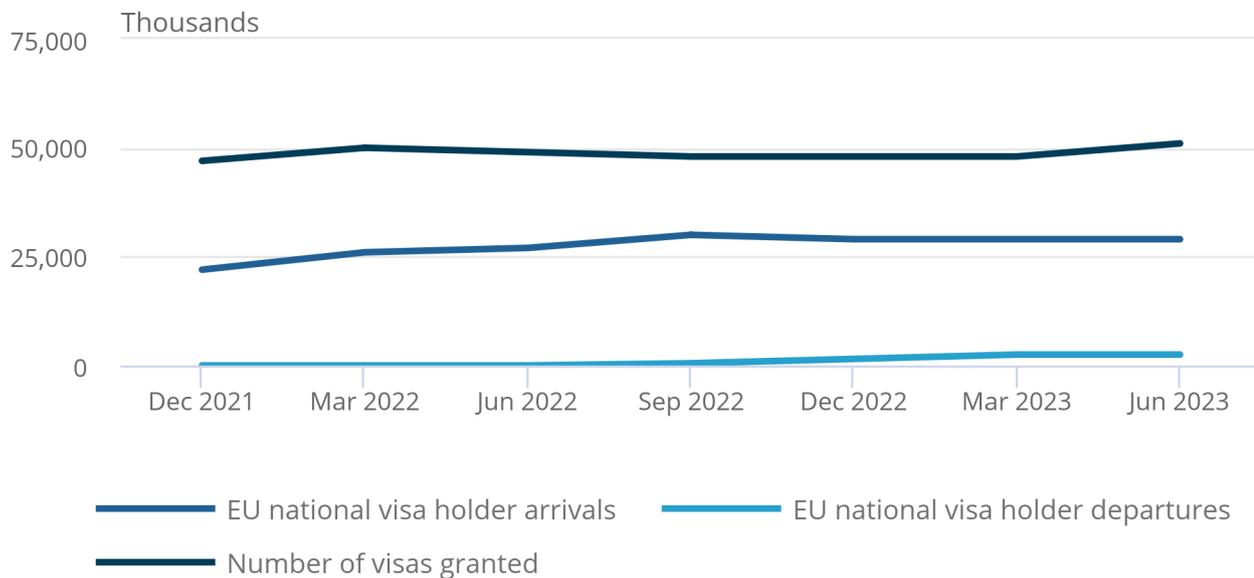
The Registration and Population Interactions Database (RAPID) remains the best available administrative data source for estimating the migration of EU nationals. Our [Methods to produce provisional long-term international migration estimates article](#) provides more information on our current method. However, since January 2021, EU nationals wanting to move to the UK either needed a visa or to apply for the EU settlement scheme (EUSS). We have made good progress in our research using Home Office Borders and Immigration (HOBI) data to provide estimates of migration for EU nationals who hold visas.

## Immigration and emigration

We have applied the same [“first arrival, last departure” \(FALD\) method](#) to EU visa holders as we currently use to produce migration estimates for non-EU nationals. We have compared these estimates of long-term immigration with data published by the Home Office showing how many long-term visas were granted to EU nationals in the same period. Initial analysis suggests that, of EU nationals that had a visa granted in the year ending (YE) June 2023, 56% arrived in the UK in that 12-month period (Figure 3). This compares with 65% for non-EU nationals in the same period.

**Figure 3: Number of EU national visa holders who arrived into the UK compared with number of entry clearance visas granted and number of EU national visa holders who emigrated, up to year ending June 2023**

Figure 3: Number of EU national visa holders who arrived into the UK compared with number of entry clearance visas granted and number of EU national visa holders who emigrated, up to year ending June 2023



**Source: Home Office Borders and Immigration data and entry clearance visa applications and outcomes from the Home Office**

**Notes:**

1. Data shown are for EU national visa holders only.
2. Data do not include those who were already resident within the UK prior to 1 January 2021, as they were permitted to apply for the EU Settlement Scheme (EUSS) and are subject to separate migration rules.
3. Data do not include short term visas (fewer than 12 months in length) or visit visas.
4. Data for number of visas granted are provided by the Home Office.
5. Number of visas granted is only comparable for those arriving in the UK and not those emigrating.
6. YE December 2022 and YE June 2023 include all arrivals on long-term visas as we are still developing adjustments to estimate those who have stayed long term.
7. Data for arrivals and number of visas granted have been rounded to the nearest 1,000, and data for emigration have been rounded to the nearest 500. This is not owing to the experimental nature of these statistics.

We have also produced estimates of EU visa holders emigrating out of the UK up to the YE June 2023 (Figure 3), using HOBI data. We expect these estimates to be low because EU nationals have only required a visa to move to the UK since January 2021. Not enough time has passed for many individuals to be coming to the end of their visas and leaving the UK. For example, if a person arrived in January 2021, they would need to remain in the UK for a period of 365 days (and be confirmed as a long-term immigrant), and then subsequently leave for another period of 365 days before being considered a long-term emigrant. Initial estimates of emigration of EU visa holders are very low until the YE December 2022, where we are starting to see the first EU visa holders coming to the end of their visas and leaving the UK.

## Reason for migration and nationality

We have also looked at the reason for immigration of EU national visa holders. Initial analysis shows the most common initial reasons for coming to the UK are for “study-related” or “work-related” reasons.

Using [Immigration system statistics data tables from the Home Office](#), we can see that of the total number of study-related visas granted to EU nationals in the YE June 2023, 54% arrived in the UK in the same period. We also see that of work-related visas granted to EU nationals in the YE June 2023, 47% arrived in the same period. More research is needed to understand why initial findings suggest a number of EU visa holders are not arriving in the UK, and to assess the coverage of the HOBI data for EU nationals compared with non-EU nationals.

Research into individual nationalities shows that HOBI data does not contain all Irish nationals who are moving to the UK as they do not require a visa. Therefore, we are exploring alternative data sources, such as RAPID, to provide coverage of this group. We are also investigating the coverage for other nationalities who may be more likely to be missed by the HOBI data if they travelled by ferry or through the common travel area.

## Future research

Further research is needed before we can be confident in using Home Office data to produce our estimates for EU migration. We need to:

- understand the length of stay of those with unmatched leave (travel events that are not linked to a visa), either because individuals visiting the UK short term do not require a visa or the system has been unable to match them
- understand the coverage of HOBI data, particularly the impact of those entering the UK through the common travel area
- develop adjustments to immigration and emigration to produce provisional estimates of migration for the most recent YE period; this will require slightly different methods to non-EU nationals, owing to us not having much historic data to base the assumptions on

Our intention is to publish a research paper next year to provide a further update on our research.

## 6 . Estimating international migration for settled international migrants

The method used to calculate the long-term migration of non-EU nationals is based around visa start and end dates. From January 2021, following the end of the Brexit transition period, the same migration controls have been applicable to both EU and non-EU nationals for those applying for new visas. There are some people who are entitled to a leave type referred to as “settlement”. This leave type includes indefinite leave to remain (ILR) and enter, the Windrush Scheme, and the EU Settlement Scheme (EUSS), which has two subcategories (settled and pre-settled). People with this leave type are not subject to the same migration controls as other visa types.

ILR gives individuals the right to live, work and study in the UK. There are different ways individuals can apply for ILR based on their circumstances. More detail can be found in the Home Office’s [Check if you can get indefinite leave to remain article](#).

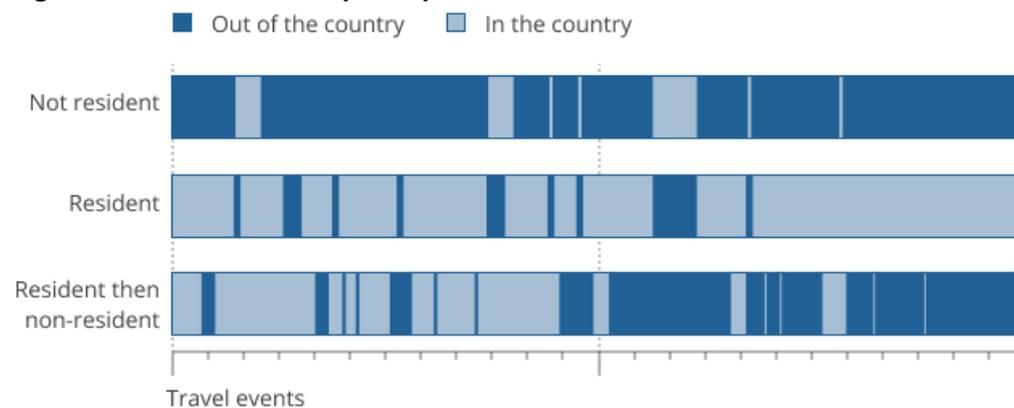
The EUSS enables EU, other European Economic Area (EEA) and Swiss citizens and their family members who are residents in the UK by the end of the EU exit transition period (31 December 2020) to obtain the status required to live and work in the UK.

Initial research using the “first arrival, last departure” (FALD) method to identify those who hold indefinite leave has shown it may not be suitable for estimating this group. Most people who are entitled to indefinite leave were residents in the UK before their application. This makes our FALD method (which assumes a visa is granted before arrival into the UK) unsuitable for this leave type, as most of those applying will already be residents in the UK and should not be included in our long-term immigration estimates. The last departure approach makes assumptions around an absence from the UK relative to the time remaining on a period of leave. Those with indefinite leave do not have a time limit on the amount of time they can reside in the UK.

We have been researching different methods to estimate the immigration and emigration of people with indefinite leave.

The method currently being researched is based around travel patterns and the amount of time spent in and out of the country. The method has been designed to be flexible in terms of defining travel periods and the maximum length of time required for someone to be categorised as a long-term migrant. For example, we do not want to count a weekend away or a week-long holiday as part of an emigration calculation.

**Figure 4: Illustrative example of periods in and out of the UK**



Source: International Passenger Survey from the Office for National Statistics

Figure 4 provides an illustrative example of three types of travel history we might see in the data. The first example shows evidence of a person who is not a resident in the UK but took several short trips to the UK. The second example shows someone who is a resident in the UK and took several trips outside of the UK. The third example shows someone that was a resident then transitioned to a non-resident. The third example also highlights one of the challenges that we face with categorising an emigration event and determining exactly when it occurred.

Owing to the requirement of residency to be entitled to settled status, the approach to classifying someone as a long-term immigrant or emigrant must be reassessed. We start from a position where someone with settled status is a resident in the UK, and therefore, the first event we look for is a long-term emigration. We have travel data going back to 2015, which means we can assess travel patterns over several years.

Using travel dates, we calculate the length of stay in and out of the UK. We identify extended trips out of the country and group them into a single travel period; we then assess the cumulative time in and out of the country. We look for two pieces of evidence that a person may have emigrated long-term. Firstly, we identify those who spend more time out of the UK than in. We then look at the total amount of time spent outside of the UK. If the total time out of the UK meets a set emigration criterion, we class them as a long-term emigrant. Once someone has emigrated, we can look for immigration events using an inverse approach (identifying extended periods within the UK, which we link together to determine whether a person meets the immigration criteria).

Research into the use of Home Office Borders and Immigration (HOBI) data for people with settlement leave is ongoing and we will continue to explore methods and improve our understanding of the data to help us define what immigration and emigration criteria are the most appropriate. We are also continuing to quality assess the data for use as a data source in the estimation of migration flows for EU nationals.

## 7 . Estimating international migration of British nationals using administrative data

While long-term international migration estimates for non-UK nationals are now based on administrative data, estimates of immigration and emigration of British nationals remain predominantly based on the [International Passenger Survey \(IPS\)](#).

As part of our work to revise the back series of UK international migration statistics for the period 2012 to 2021, we have revised our historic estimates for the international migration of British nationals. This is to take account of evidence from the 2011 Census and Census 2021 on the change in the size of the UK-born population over the decade. These changes have resulted in a significant increase to our [estimates of emigration of British nationals from 2012 to 2021](#).

We do not currently have sufficient evidence to indicate whether the higher levels of British emigration seen prior to Census 2021 continued into 2022 and 2023. Therefore, from the year ending (YE) September 2021 onwards, we are continuing to use estimates from the IPS, while we undertake further research to identify an administrative data-based alternative.

In July 2022, a feasibility study was conducted on advanced passenger information (API) ([See Section 9: Glossary](#)) with the aim of assessing whether it could provide an additional data source for migration estimates that improve the quality. The findings found API could be useful for assessing arrivals and departures of British nationals.

The Registration and Population Interactions Database (RAPID) data also has potential to be used to identify migration of British nationals. The main challenge is the uncertainty of migration events for British nationals. There are numerous ways someone can be inactive on the Department for Work and Pensions' and HM Revenue & Customs' systems as a British national and remain in the UK (for example, a student or someone not in employment, education or training (NEET)). As part of our research, we will investigate how to adjust for these subpopulations.

## 8 . Non-UK born population levels

On 24 November 2022, we published provisional measures that roll forward the Census 2021 data in our [International migration research, progress update article](#). This produces updated levels of non-UK born people living in England and Wales in June 2022. As a result of our flows estimates being revised, the levels published in November 2022 for the non-UK born population may differ from what today's published data series suggest.

Historically, we measured non-UK born population levels using the Annual Population Survey (APS). However, as noted in our [Statement on population of the UK by country of birth and nationality series](#) in October 2022, we have discontinued this APS-based series.

We previously mentioned in our May 2023 publication that we would aim to publish a revised estimate to provide an overall UK estimate. National Records Scotland have yet to publish results from the Scottish Census on the non-UK born population, so at this moment in time, we are unable to provide an update for the UK.

In the future, with the support of our partners, including all devolved administrations, our ambition is to produce a UK estimate of the non-UK born population. Our aim is to publish estimates of the non-UK born population that are consistent with overall population estimates.

## 9 . Glossary

This is a condensed version of the full glossary of terms used in our bulletin [Long-term international migration, provisional: year ending June 2023 bulletin](#).

### Administrative data

Collections of data maintained for administrative reasons, for example, registrations, transactions, or record keeping. They are used for operational purposes and their statistical use is secondary. These sources are typically managed by other government bodies.

### Advanced passenger information

Advanced passenger information (API) is constructed of records generated by the process whereby passengers are required to provide certain information to the airline or travel company before travel. The information normally details passport number, the name on the passport, gender, and date of birth.

### British national

A British national is a person who holds a type of British (English, Scottish, Welsh, and Northern Irish) nationality. The six different types of British nationality are:

- British citizenship
- British Overseas Territories citizen
- British overseas citizen
- British subject
- British National (Overseas)
- British protected person

For the purposes of our estimates, we have treated British National (Overseas) (BN(O)) as a separate category.

## EU

EU is the sum of EU14, EU8, and EU2, plus Malta, Cyprus and Croatia (from 1 July 2013). British nationals are not included in these numbers.

## Home Office Borders and Immigration data

Combines data from different administrative sources to link an individual's travel in or out of the UK with their immigration history. This system has data for all non-European Economic Area (non-EEA) visa holders.

## International Passenger Survey

Our International Passenger Survey (IPS) collects information about passengers entering and leaving the UK and has been running continuously since 1961. The IPS was resumed in January 2021, after being suspended since March 2020 because of the coronavirus (COVID-19) pandemic. Currently, we use it for our British national estimates and for providing information on reason for migration.

## Long-term international migration

Long-term international migration (LTIM) statistics estimate the flow (or movement) of migrants to and from the UK. This publication uses the UN-recommended definition of a long-term international migrant, as explained in the [Recommendations on Statistics of International Migration paper \(PDF, 5MB\)](#). It is defined as "A person who moves to a country other than that of his or her usual residence for a period of at least a year (12 months), so that the country of destination effectively becomes his or her new country of usual residence."

A long-term international immigrant in this publication refers to a person who has moved to the UK from abroad for a period of at least a year.

A long-term international emigrant in this publication refers to a person who has left the UK to go to another country for a period of at least a year.

## Non-EU

Non-EU is the sum of the rest of the world, including the rest of Europe. British nationals are excluded from these numbers.

## Registration and Population Interaction Database

The Registration and Population Interaction Database (RAPID) is a database created by the Department for Work and Pensions. It provides a single coherent view of interactions across the breadth of benefits and earnings datasets for anyone with a National Insurance number (NINo).

## 10 . Related links

### [Behaviour shifts and the implications for migration statistics](#)

Blog | Released 23 November 2023

Net migration to the UK has been running at record levels. Driven by a rise in people coming for work, increasing numbers of students and world events, the patterns of migration have changed with more arrivals from outside of the EU than in the previous decade. Emma Rourke explains how the ONS is interpreting these behavioural changes, how they feed into the latest data and the implications on other population statistics.

### [Methods to produce provisional long-term international migration estimates](#)

Methodology | Released 23 November 2023

An explanation of the methods used to produce the latest provisional experimental statistics on migration flows into and out of the UK.

### [Long-term international migration, provisional: year ending June 2023](#)

Bulletin | Released 23 November 2023

Official statistics (in development) of UK international migration, year ending (YE) June 2012 to year ending June 2023; estimates from YE December 2022 and YE June 2023 are provisional and will be updated when more complete data are available.

### [Estimating UK international migration: 2012 to 2021](#)

Article | Released 23 November 2023

How migration has changed over the decade, the methods used to produce the updated series and the evidence used to demonstrate confidence that the new methods are robust.

### [Improving international migration statistics using administrative data](#)

Article | Released 23 November 2023

Describes how we estimate international migration and the data we use. Includes an explanation of our research, the improvements we have made and future developments.

### [What is coming up on population and migration statistics](#)

Article | Released 17 November 2023

An overview of upcoming population and migration publications as we make improvements to how we measure population and migration.

### [Long-term international migration: quality assuring administrative data](#)

Article | Released 16 November 2023

Administrative data sources and quality assurance in the production of admin-based long-term international migration estimates published in bi-annual releases.

### [Dynamic population model, improvements to data sources and methodology for local authorities, England and Wales: 2021 to 2022](#)

Methodology | Released 27 June 2023

Update on the data and methodology used by the dynamic population model (DPM) to produce admin-based population estimates (ABPE). Experimental Statistics.

### [Population and migration estimates – exploring alternative definitions: May 2023](#)

Article | Released 25 May 2023

Considering new ways of estimating the population to enhance our existing statistics.

## 11 . Cite this article

Office for National Statistics (ONS), released 23 November 2023, ONS website, article, [International migration research: progress update, November 2023](#)