

International Passenger Survey: Quality Information in Relation to Migration Flows

About this note

This note provides an overview of the quality of the International Passenger Survey (IPS) for estimating international migration flows and has been updated following additional work carried out during 2016.

What is the International Passenger Survey (IPS)?

The [International Passenger Survey \(IPS\)](#) is a multi-purpose sample survey that collects information from passengers as they enter or leave the UK. It is carried out by the Office for National Statistics (ONS) for a range of public and private sector organisations. It is mainly used to provide data about international migration, travel expenditure and tourism. This document focuses on the use of IPS data to produce Long-Term International Migration (LTIM) estimates.

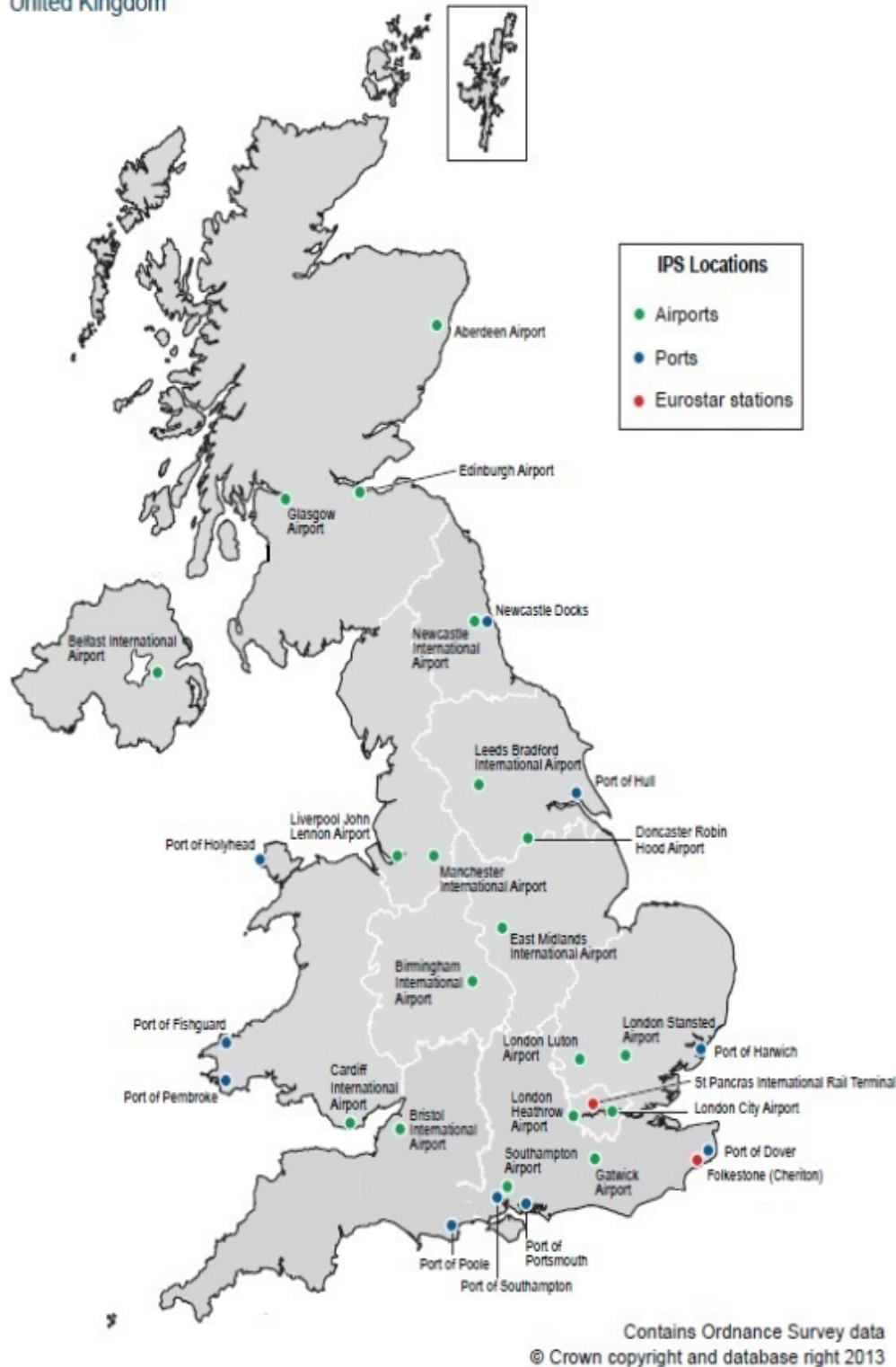
Where is the IPS carried out?

The IPS covers airports, seaports and the Channel Tunnel. The IPS is not carried out on sea routes to and from the Channel Islands, at the land border with the Irish Republic, or on cruise ships travelling to and from the UK. Map 1 shows each port at which IPS interviewing currently takes place.

LTIM estimates use other sources of data to cover these routes. Please refer to Section 2.1 of the [LTIM Methodology Document](#) for further information.

Map 1 International Passenger Survey Locations

United Kingdom



Source: Office for National Statistics – International Passenger Survey.

Note: Folkestone (Cheriton) is where passengers and interviewers embark for Eurotunnel, it is not a Eurostar station.

Who could be included in the IPS sample?

The IPS is carried out 362 days a year and overall approximately 90% of passengers entering and leaving the UK are covered (that is, they have a chance of being interviewed). The remainder are passengers travelling:

- Via smaller airports and seaports with fewer passengers; and
- at night, between approximately 10pm and 6am, outside IPS interviewing hours.

It should also be noted that the IPS does not collect information about passengers travelling across the land border between the Republic of Ireland and Northern Ireland, or passengers travelling on international cruises (including cruise departures, terminations and port-of-call visits).

Although overall 90% of passengers are covered¹, this proportion can vary throughout the year and by the type of port through which passengers are travelling. The proportion of passengers who could have been sampled by the IPS in 2015, for air, sea and tunnel routes is shown in Table 1.

Table 1: Proportions of passengers who were subject to sample by the IPS in 2015, by route and quarter

Route	Q1	Q2	Q3	Q4
Air	92%	87%	86%	90%
Sea	98%	98%	98%	98%
Tunnel	100%	100%	100%	100%
TOTAL	93%	89%	89%	92%

Source: Civil Aviation Authority, Heathrow Airports Holdings Ltd, Department for Transport, Eurostar, Eurotunnel and a number of other airports.

Sampling is most complete on Channel Tunnel routes (100%), followed by sea routes (around 98% across the year) and air routes (around 89% across the year). Coverage of air routes is slightly lower during quarters two and three than during quarters one and four. This may relate to seasonal changes in flight times and routes throughout the year. The overall coverage of the IPS is around 90%. Only a small proportion of overall passenger flows are by sea and the Channel Tunnel (less than 20%), so the remainder of the analysis focuses mainly on air passengers.

The Civil Aviation Authority (CAA) collects data on activity from approximately 60 UK airports, including passenger numbers. The IPS weighting process constrains estimates of air passengers to the totals obtained from the CAA. Here the analysis compares the proportions of passengers on flights between the UK and groupings of other countries' airports to compare the distributions by grouped country of flight origin and destination.

Table 2 shows few differences in distribution, since the proportions of passengers in the IPS estimates by origin and destination countries are similar to those shown in CAA data for the groupings presented. The proportions vary slightly across country groupings, for example, the CAA data show 1.1% of passengers on flights to/from EU2 countries, while the IPS estimates show 1.2% of passengers to/from EU2 countries.

¹ These proportions are calculated using data from the Civil Aviation Authority, Heathrow Airports Holdings Ltd, Department for Transport, Eurostar, Eurotunnel and a number of other airports.

Table 2: Proportions of passengers on IPS compared to Civil Aviation Authority, 2014, arrivals and departures combined

Country grouping	Proportions of passengers recorded by CAA	Proportions of passengers on IPS (weighted)
EU2	1.1	1.2
EU8	5.2	5.6
EU15	55.7	57.9
Other EU*	2.3	2.3
Non-EU	35.7	33.0
Total	100.0	100.0

Source: Civil Aviation Authority and Office for National Statistics – International Passenger Survey.

*Other EU consists of Cyprus, Malta and Croatia.

What about passengers who travel by coach?

Passengers arriving by coach at UK seaports are either interviewed on arrival at a UK seaport, or on the ship. Since November 2015, migrants arriving by coach via the France-Portsmouth/Newhaven/Poole routes are interviewed on arrival in Portsmouth. Prior to this, arrival interviews were also conducted on departure from French quayside. Otherwise, passengers are sampled quayside at other ports, onboard the ferry or Eurotunnel train (Dover-Calais/Dunkirk and Eurotunnel routes to/from Cheriton). The choice between these methods is made on practical grounds, including cost, safety and permission by the ferry company. Where interviews are conducted quayside or onboard the Channel Tunnel Shuttle with coach passengers, it is down to the discretion of the driver whether to allow IPS interviewers to board the coach and interview passengers. Feedback from interviewers indicates that this is not a frequent problem and there are high response rates on these routes.

Are we missing long-term migrants by not interviewing at night?

The IPS does not typically interview passengers between 10pm and 6am. Since total passenger numbers from the CAA are used in the weighting process for air passengers, not interviewing passengers who travel at night is only a problem if the number and characteristics of those responding during interviewing hours ('in-hours') are different to those travelling 'out-of-hours'.

The number of flights arriving and departing outside IPS interviewing hours can be analysed using CAA data. For the purpose of this analysis a standard assumption was made that all the flights landing and taking off between 10:00pm and 5:59am are treated as out-of-hours traffic. Table 3 shows the percentage of flight routes that are out-of-hours by arrivals and departures. These figures do not consider the number of passengers on a flight, which varies considerably across different flight routes. Since it takes time to pass through an airport, passengers arriving on flights which land just before 6am may be included in the sample, while passengers arriving on flights landing just before 10pm may not cross counting lines in time to be included in the sample. Also, it should be noted that the CAA data includes flights from airports which are not sampled by IPS due to low traffic flow but the weighted figures account for those flights.

Table 3: Percentage of flight routes that are out-of-hours by arrivals and departures, 2014

Country grouping	Arrivals			Departures		
	In-hours flights	Out-of-hours flights	% Out-of-hours	In hours flights	Out-of-hours flights	% Out-of-hours
EU2	1,140	274	19%	1,270	149	11%
EU8	4,696	1,295	22%	5,381	189	3%
EU15	65,631	15,128	19%	72,721	2,321	3%
Other EU*	2,352	1,651	41%	3,511	111	3%
Non-EU	26,938	6,816	20%	27,986	2,163	7%
TOTAL	100,757	25,164	20%	110,869	4,933	4%

Source: Civil Aviation Authority (CAA).

*Other EU consists of Cyprus, Malta and Croatia

Table 3 shows that overall, 20% of arriving flights and 4% of departing flights are not sampled by the IPS due to being out-of-hours². For all country groupings, arriving flights are more likely to be out-of-hours than departures. Similarly to site coverage, these figures vary by the flights' country of origin/destination. Other EU countries (Cyprus, Malta and Croatia) had the highest proportions of out-of-hours arrivals, followed by EU8 countries and non-EU countries. EU15 and EU2 countries had the lowest proportions of out-of-hours arrivals, while EU8, EU15 and Other EU countries had the lowest proportions of out-of-hours departures. Table 4 shows further analysis of CAA data, broken down by the hour of flight arrival.

Table 4: Number of CAA flight routes arriving out-of-hours in 2014 by time

Country grouping	00:00 to 00:59	01:00 to 01:59	02:00 to 02:59	03:00 to 03:59	04:00 to 04:59	05:00 to 05:59	22:00 to 22:59	23:00 to 23:59	06:00 to 22:00
EU2	34	22	32	31	16	18	65	56	1,140
EU8	153	63	34	17	7	1	571	449	4,696
EU15	2,794	1,586	822	529	372	217	4,644	4,164	65,631
Other EU*	350	378	253	89	41	18	256	266	2,352
Non-EU	976	938	661	448	560	904	1,237	1,092	26,938
Total	4,307	2,987	1,802	1,114	996	1,158	6,773	6,027	100,757

Source: Civil Aviation Authority (CAA).

*Other EU consists of Cyprus, Malta and Croatia

Table 4 shows that for EU2, EU8 and most EU15 countries, the majority of out-of-hours flight routes arrived between 22:00 and 23:59. Arrival times for non-EU countries show the most out-of-hours arrivals between 22:00 and 22:59, with decreasing numbers of flight routes arriving each hour through the night and a slight increase again between 04:00 and 05:59. Given the time it takes to reach the counting line, most non-EU passengers arriving between 05:00 and 05:59 are likely to be sampled. These figures suggest that flights arriving outside interviewing hours are most frequent between 22.00 and 23:59.

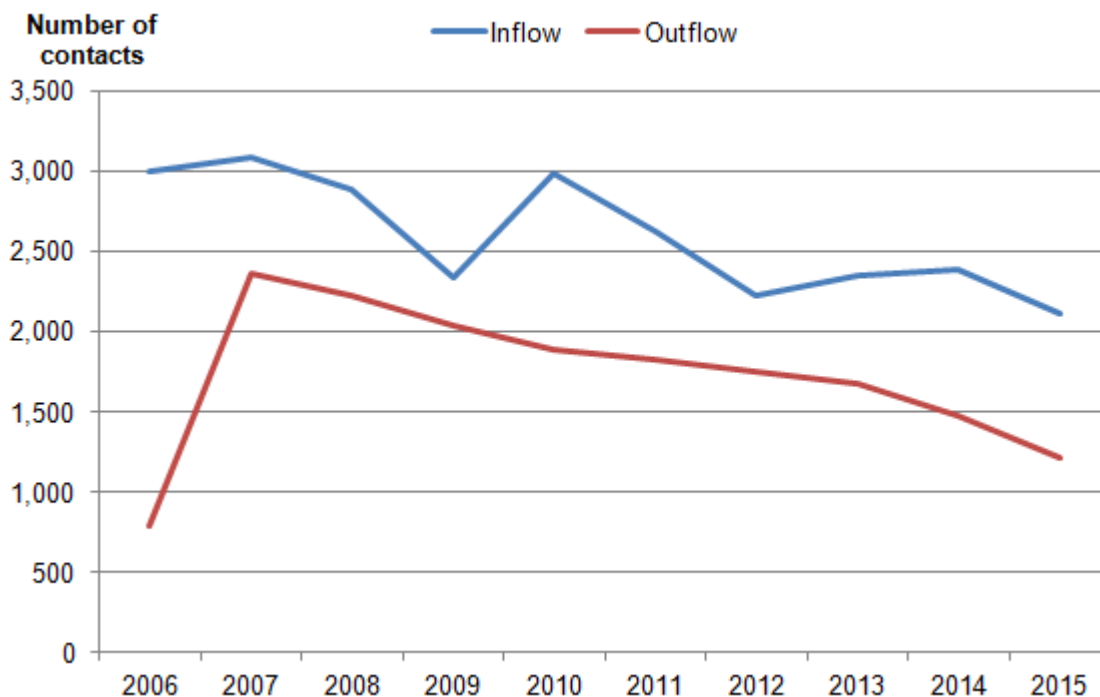
² The analysis in tables 3 and 4 relates to number of flight routes and not passengers as in tables 1 and 2. The number of passengers varies on these routes.

To provide more information ONS are considering an out-of-hours IPS pilot. The main purpose of the pilot would be to investigate whether the characteristics of passengers arriving and departing outside interviewing hours differ to those of passengers already sampled by the IPS.

How many people does the IPS collect information from?

In total, approximately 700,000 IPS interviews are conducted each year for migration purposes. This represents around 0.4% of the over 200 million passengers eligible for the survey who pass through UK ports each year. Of these, around 4,000 interviewees are identified as long-term international migrants, although the numbers vary from year to year, as shown in Figure 1. The number of long-term migrant outflow contacts increased considerably in 2007, following the recommendation of the [Port Survey Review](#) to establish migration filter shifts³ for emigration. Migration filter shifts were discontinued in 2009, but numbers of migrant contacts were largely maintained by increasing the proportion of passengers in regular IPS shifts who are asked questions to determine their intentions to migrate (travel and tourism cases are subsampled from respondents who are not migrants).

Figure 1: Number of long-term migrant contacts in the IPS, inflows and outflows, 2006 to 2015



Source: Office for National Statistics – [Table 1.02, Long Term International Migration 1 Series](#).

Figure 1 shows that the number of long-term migrant contacts sampled by the IPS has decreased in recent years, particularly for outflows. Lower numbers of contacts are likely to lead to increased sampling error around migration estimates (see sampling error section below).

One possible explanation for the declining number of IPS contacts is increased overall passenger flows through UK ports. The more passengers there are to sample, the less likely it is that long-term

³ Migrant filter shifts are IPS interviewing shifts aimed specifically at boosting the number of migrant contacts.

migrants (a very small proportion of overall passenger flows) will be identified. The CAA data and other sources of data for measuring traffic flows show that total passenger flows to and from the UK increased by 19% between 2010 and 2015, from 213.6 million to 254.3 million. It has mainly been air traffic contributing to the increase in passenger flows. Sea and tunnel passenger numbers have also increased since 2008.

An IPS sample optimisation exercise, designed to ensure the IPS sample is designed as efficiently and effectively as possible, was implemented in 2016. Changes were made in the numbers of shifts conducted across sites and five smaller ports were removed from the IPS sample, because the characteristics of passengers from these ports were sufficiently represented by passengers at other ports. Migration filter shifts were reintroduced at key sites in October 2016; this should slightly increase the precision of IPS migration estimates.

In summary, the IPS identifies around 4,000 long-term migrants from interviews with approximately 700,000 passengers each year. The number of long-term migrant contacts is subject to sampling variation and has decreased slightly in recent years, reflecting higher passenger flows that make it less likely for long-term migrants to be sampled.

What about non-response?

The overall IPS response rate (complete and partial interviews) for the 2015 IPS was 78.4%. Response rates vary across routes, as shown in Table 5.

Table 5: IPS response rates, 2014 and 2015

Route type	Direction	Complete and Partial Response Rate (%)	
		2014	2015
Air	Arrivals	76.7	76.1
	Departures	79.6	79.3
	Total	78.4	77.9
Sea	Arrivals	86.2	84.7
	Departures	88.1	81.9
	Total	87.2	83.2
Tunnel	Arrivals	77.9	76.0
	Departures	80.8	82.3
	Total	79.3	79.0
Total	Arrivals	77.5	76.8
	Departures	80.3	79.7
	Total	79.1	78.4

Source: Office for National Statistics – International Passenger Survey.

It should be noted that a response rate of 78.4% does not mean that 21.6% of passengers approached to participate in the IPS refused to answer the survey. Around 68% of non-response is due to “clicks” (see section below) and only around 5% of passengers approached provide a minimum response or refuse to take part. “Clicks”, passengers not contacted for other reasons, minimum responses and refusals are discussed in turn below.

“Clicks”

“Clicks” occur when a passenger is sampled, but there is no interviewer available to approach them for an interview as they may, for example, all be interviewing other passengers. Passengers are

systematically chosen for interview using a pre-set interval (for example, every 1 in 20) and cannot be substituted if an interviewer is not available. These passengers are counted as 'clicks'. Sudden fast flow of passengers is common at some ports, for example when a train arrives at St Pancras International. The number of clicked passengers is unlikely to skew the profile of the IPS sample as the occurrence of "clicks" is independent of the characteristics of the passengers.

Other passengers not contacted

A proportion of the 'non-response' figure is due to passengers not being contacted for other reasons, for example, if they are using their mobile phone (it is IPS policy not to interrupt passengers when they are on the phone). The IPS non-contact rate increased slightly from 2.0% in 2011 to 2.6% in 2015. Analysis by port shows that Heathrow airport has a higher number of non-contacts (5%).

Ineligible passengers

Some of the individuals who cross IPS counting lines are ineligible to participate in the IPS, for example, if they are travelling on a flight to another destination within the UK, or are flight crew members or airport employees.

Minimum responses and refusals

Minimum responses are used in the calculation of the number of visits to and from the UK, but cannot be used to estimate migration unless length of stay is collected. From 2015, interviewers have been encouraged to collect length of stay from respondents whenever possible even where the result is only a minimum response. Analysis by port shows that in 2015, 5.1% of interviews at Heathrow resulted in minimum responses, compared to 2.9% of interviews overall. Heathrow also has a higher proportion of refusals at 2.4%, in comparison to the overall IPS refusal rate of 2.1%. Although refusals and minimums are higher at Heathrow compared to other ports, the overall rates of minimum responses and refusals for the IPS are still low, accounting for around 5% of cases. The response rate to the IPS remains high (78.4%).

Non-English speaking passengers

It is important that the IPS collects information from non-English speaking passengers, as these people may have different characteristics to English speaking passengers. IPS interviewers are provided with specific guidance and prompts for interviewing passengers whose first language is not English. The IPS team also produce foreign language sheets for use by non-English speaking passengers. IPS interviewers use these to guide the respondents through the questionnaire. Interviewing passengers who do not speak English can be a challenge, but interviewers are skilled at obtaining the required information. A complex weighting system (described in the [Methodology](#)) takes account of all minimum responses and non-response in the IPS.

How reliable are migration estimates from the IPS?

There are two broad types of variability associated with migration estimates from the IPS. These are: variability because of the many different samples that could have been drawn during the interview period (known as 'sampling error') and variability due to other factors ('non-sampling error').

Non-sampling error

Non-sampling error would be introduced if those who respond to the survey have different characteristics to those who do not respond. The weighting applied to the estimates of total passenger flows accounts for those who do not respond, but if their migration characteristics are different in some way then non-response bias would occur. Measurement error would be introduced, for example, if respondents provide incorrect information to the IPS interviewers. Confidence intervals do not take account of non-sampling errors such as non-response bias and measurement errors.

Sampling error

As is the case with all sample surveys, the estimates produced from the IPS are based upon one of a number of samples that could have been drawn during the interview period. This means that there is a degree of variability around the estimates produced. Since August 2012, migration estimates based on the IPS have been accompanied by confidence intervals, which provide a range within which we could expect the true value to lie had all passengers been interviewed. In general, 95% confidence intervals are used, which is a widely accepted level, meaning that over many repeats of the sample under the same conditions, we would expect the confidence interval to contain the true value 95 times out of 100. Equivalently, we can say that there would be a 1 in 20 chance that the true value would fall outside of the range of the 95% confidence interval. Caution should be exercised when using an estimate with a large confidence interval.

The degree of variability around IPS estimates is also important to consider when comparing differences between estimates, as the variability may lead to spurious differences. If a change or a difference between estimates is described as 'statistically significant', it means that statistical tests have been carried out to reject the hypothesis that the change is likely to have occurred by chance. Therefore significant changes are very likely to reflect real changes in migration patterns.

A quick method of testing the difference between two estimates is to determine if there is an overlap between their confidence intervals; if there is no overlap, the difference can be described as statistically significant. If there is overlap, a t-test can be used to determine if the change is statistically significant. A t-test is a statistical test that calculates a confidence interval for the difference between the estimates, as opposed to the estimates themselves. All the main statistical software packages have the functionality required to perform a t-test. If you need assistance with identifying whether the difference between two international migration estimates is statistically significant then please contact migstatsunit@ons.gov.uk.

How do international migration statistics from the IPS compare to those from other sources?

All sources of international migration statistics are valuable in their own right and provide us with an understanding of the flows of international migrants, as well as the numbers of international migrants in the household population. For information about the variations between different sources of migration data, please refer to this [note on the comparability of migration sources](#), which summarises the main differences between sources of international migration statistics and provides links to further information.

Further Links

- International Migration Statistics [First Time User Guide, Glossary and List of Products](#)
- International Passenger Survey [Quality and Methodology Information Paper](#)
- International Passenger Survey [Methodology](#)
- Long Term International Migration [Data Tables](#)
- Long Term International Migration [Frequently Asked Questions and Background Notes](#)
- Long-Term International Migration [Methodology Document](#)
- [Migration Statistics Quarterly Report](#)
- Migration Statistics Quarterly Report [User Information](#)
- [Note on the difference between National Insurance number registrations and the estimate of long-term international migration: 2016](#)
- [Note on the differences between Long-Term International Migration flows derived from the International Passenger Survey, and estimates of the population obtained from the Annual Population Survey](#)
- [Note on the comparability of migration sources](#)
- [Port Survey Review](#)
- [Travel Trends](#)