

Estimates of station usage

April 2022 to March 2023

14 December 2023

Background:

This annual statistical release contains estimates of the total number of people:

- travelling from or to each station (**entries and exits**)

- travelling between pairs of stations (**flows**)

- changing trains at each station (**interchanges**)

Numbers presented in this release are rounded

Estimates of station usage are derived from LENNON, the rail industry's ticketing and revenue system, together with some local ticketing data. A number of adjustments are made to improve accuracy of the estimates.

Sources: LENNON and local ticketing data

Latest year: 1 April 2022 to 31 March 2023

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Next publication:

November 2024

In Great Britain, **2,578 stations** were served by mainline rail services as at 31 March 2023, including eight new stations which opened during the year.

A total of 1,385 million [passenger journeys](#) were made between April 2022 and March 2023. This is an increase of 40% from the 990 million journeys made in the previous year (April 2021 to March 2022).

Most and least used stations

The most used station in the latest year was **London Liverpool Street** with an estimated **80.4 million entries and exits**. It was the fourth most used station in the previous year (April 2021 to March 2022), but the opening of the central section of the Elizabeth line has seen a large increase in its entries and exits. London Paddington which also has Elizabeth line services was the second busiest station. London Waterloo, which had been the busiest station in 17 of the previous 18 years, was third busiest.

Table 1 Top five most used stations in Great Britain, April 2022 to March 2023

Rank	Station	Entries and exits	Rank one year ago
1	London Liverpool Street	80,400,000	4
2	London Paddington	59,200,000	6
3	London Waterloo	57,800,000	1
4	London Bridge	47,700,000	3
5	London Victoria	45,600,000	2

Birmingham New Street was the busiest station outside of London with 30.7 million entries and exits.

Teesside Airport, which had its service suspended in May 2022, was the least used station with two entries and exits. Of stations that were open for the whole year, **Denton** in Greater Manchester was the least used with 34 entries and exits.

All data tables, a quality and methodology report, frequently asked questions and an interactive dashboard associated with this release are published on the [Estimates of station usage page](#) of the data portal.

1. Introduction

Why estimates?

These statistics on station usage are estimates based primarily on ticket sales. The data sources and methodology used is the best approach possible given Great Britain does not have a fully gated rail network or comprehensive and robust count data at every station.

There are a number of limitations using this approach which users should be aware of:

- Some ticket sales and ticketless travel are not included, which may mean that usage at some stations is *underestimated*. This will vary by station.
- Ticket sales data does not always specify precise journey origins and/or destinations, so these are estimated using alternative data sources.
- Methodology improvements, e.g. inclusion of ticket sales previously not available, better allocation of journeys to specific stations, means that estimates are not always comparable over time. For the April 2022 to March 2023 statistics, improvements to account for the impact of split ticketing and better allocation of journeys to London Terminal stations means that estimates are not comparable to the previous year for many stations.

Further information on the methodology underlying these statistics and their limitations can be found in Annex 1 and in the [Quality and methodology report](#).

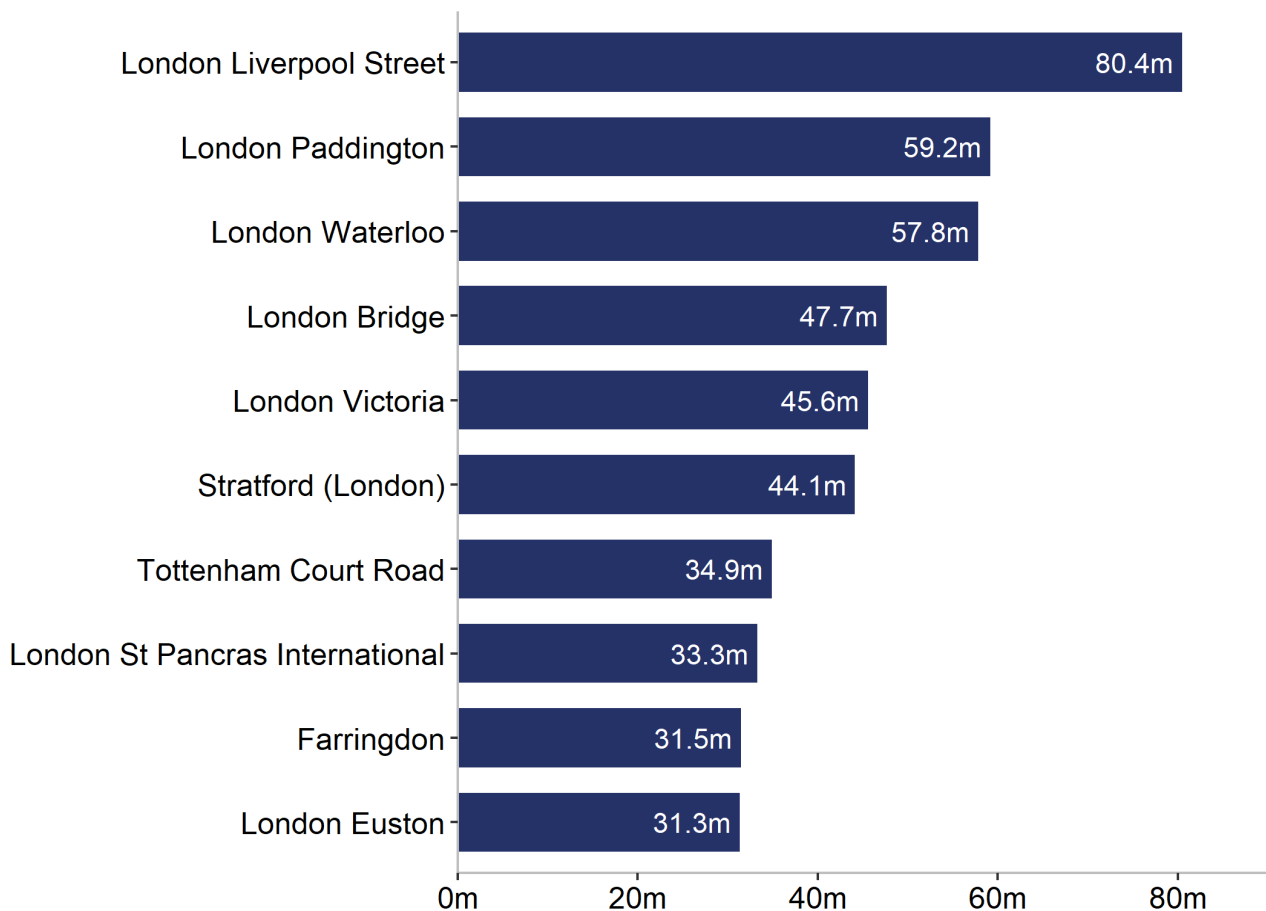
2. Station entries and exits

Stations with the most entries and exits

The most used station in the latest year (April 2022 to March 2023) was **London Liverpool Street** with an estimated **80.4 million entries and exits**. The station was fourth busiest in the previous year (April 2021 to March 2022) but the opening of the central section of the Elizabeth line in May 2022 has seen a large increase in its entries and exits.

Figure 2.1 London Liverpool Street was the most used station in Great Britain

Ten most used stations in Great Britain, April 2022 to March 2023

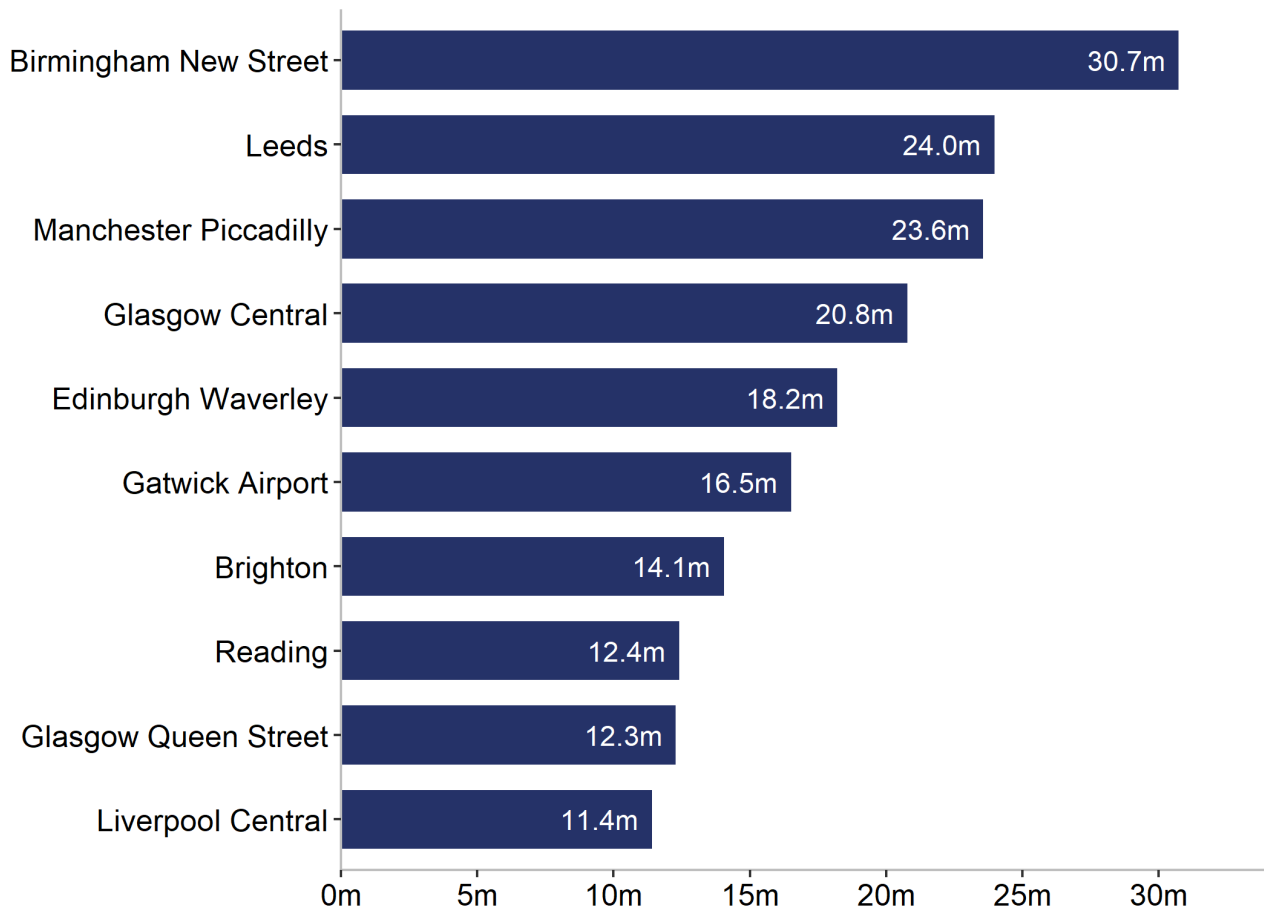


London Paddington, also served by the Elizabeth line, was the second busiest station in the latest year. London Waterloo was the third busiest station in the latest year, previously it had been the most used station for 17 out of the previous 18 years.

Tottenham Court Road, a new mainline rail station in central London, served only by the Elizabeth line opened in May 2022. Despite not being open for the full year, it was the seventh busiest station in Great Britain with 34.9 million entries and exits.

Figure 2.2 Birmingham New Street was the most used station outside of London

Ten most used stations outside of London, April 2022 to March 2023



Outside of London, Birmingham New Street was the most used station with 30.7 million entries and exits in the latest year. This made it the eleventh busiest station nationally. Glasgow Central was the most used station in Scotland with 20.8 million entries and exits. The most used station in Wales was Cardiff Central with 10.2 million entries and exits.

Stations with the least entries and exits

The station at Stanlow and Thornton in Cheshire was temporarily closed throughout all of the latest year due to safety concerns with the footbridge, which is the only entrypoint to the station, therefore has no recorded entries and exits.

Teesside Airport had two entries and exits in the latest year, however its once a week Sunday service was suspended in May 2022 after the platform was classified as unsafe.

The least used station that was open throughout the whole year was **Denton** with 34 recorded entries and exits. This Greater Manchester station had the fourth lowest usage one year ago (April 2021 to March 2022) when it had 50 entries and exits.

Overall there were five open stations with 100 or fewer entries and exits in the latest year:

1. Teesside Airport, Darlington (2 entries and exits)
2. Denton, Greater Manchester (34)
3. Elton and Orston, Nottinghamshire (56)
4. Kirton Lindsey, North Lincolnshire (94)
5. Reddish South, Greater Manchester (100)

It is worth noting that the services at Kirton Lindsey were suspended for most of the year, between 1 April 2022 to 13 January 2023. Each of the three stations with the lowest usage, Teesside Airport, Denton and Elton and Orston have historically had low usage. Each of them has appeared on this list more than once in recent years.

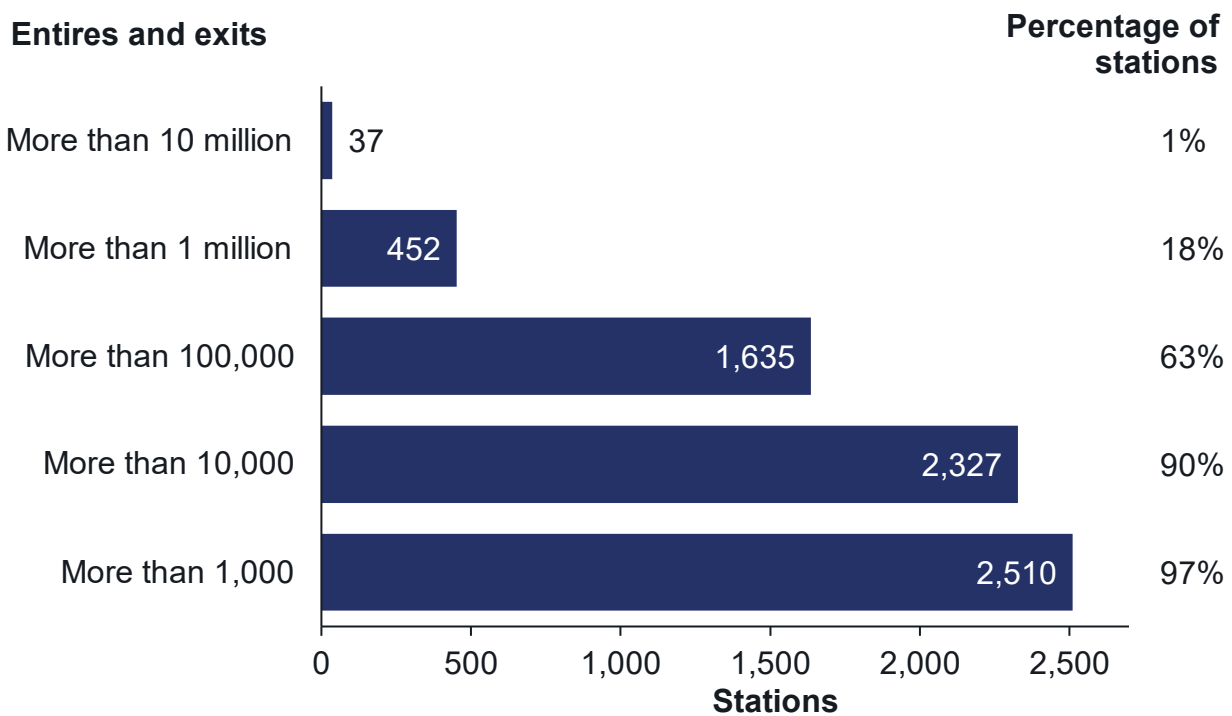
In previous years, usage at some of the least used stations presented as part of these statistics have greatly increased the following year. We understand that highlighting the least used stations within these statistics can encourage people to visit them.

Distribution of entries and exits

Across the mainline network stations have very different characteristics.

Figure 2.3 Across Great Britain, 37 stations had more than 10 million entries and exits

Distribution of entries and exits by station, April 2022 to March 2023



In the latest year, 452 out of 2,578 (18%) stations in Great Britain had more than 1 million entries and exits. Of these, 37 had more than 10 million.

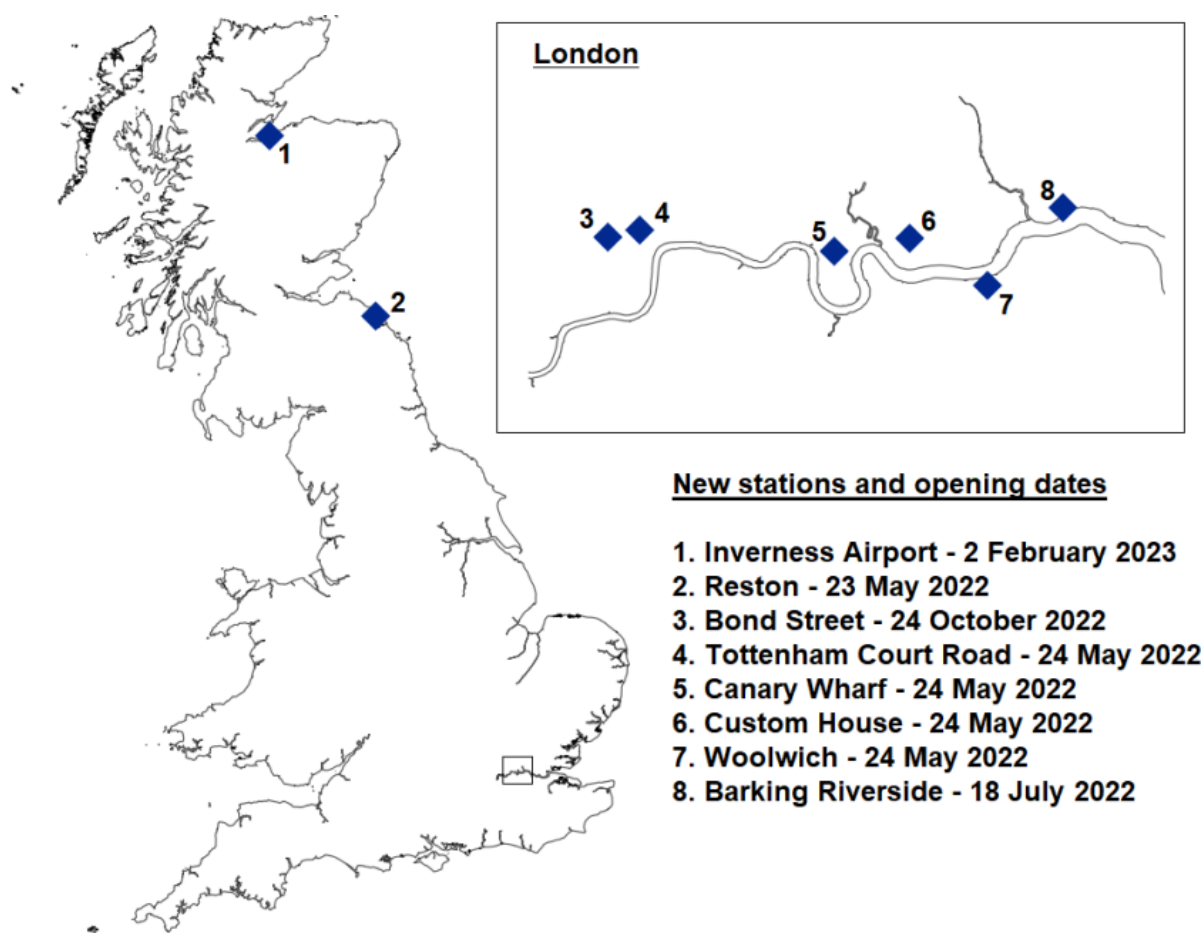
New and closed stations

In Great Britain, 2,578 stations were served by mainline rail services as at 31 March 2023, as presented in our latest [Rail infrastructure and assets statistics](#). This publication includes a dataset ([Table 6329](#)) containing geographic and other attribute information for each mainline station, including location co-ordinates (Easting and Northing), county, constituency and station facility owner.

Eight new stations opened during the year April 2022 to March 2023 and no stations permanently closed to mainline services.

Figure 2.4 Eight new stations opened in latest year

Stations opened, Great Britain, April 2022 to March 2023



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Five of the new stations are served by the Elizabeth line, and except for Bond Street, opened on 24 May 2022:

- Bond Street (opened 24 October 2022) – 19,400,000 entries and exits,
- Canary Wharf – 9,920,000,
- Custom House – 5,270,000,
- Tottenham Court Road – 34,900,000,
- Woolwich – 8,340,000.

The three other stations:

- Barking Riverside is served by London Overground and opened 18 July 2022 – 461,000 entries and exits,
- Inverness Airport is served by ScotRail and opened 2 February 2023 – 6,100 entries and exits,
- Reston is served by ScotRail and opened 23 May 2022 – 13,200 entries and exits.

Table 2.2 The three stations with most journeys to or from each new station, April 2022 to March 2023

Station name	Busiest flow (number of journeys)	Second busiest flow (number of journeys)	Third busiest flow (number of journeys)
Barking Riverside	Barking (134,000)	West Ham (72,000)	Blackhorse Road (64,600)
Bond Street	Tottenham Court Road (3,930,000)	London Paddington (3,720,000)	London Liverpool Street (3,070,000)
Canary Wharf	Tottenham Court Road (1,990,000)	London Liverpool Street (1,520,000)	Farringdon (1,010,000)
Custom House	Tottenham Court Road (1,170,000)	London Liverpool Street (854,000)	Farringdon (549,000)
Inverness Airport	Inverness (2,390)	Elgin (1,130)	Forres (610)
Reston	Edinburgh Waverley (9,370)	Dunbar (950)	Berwick-Upon-Tweed (810)
Tottenham Court Road	London Liverpool Street (5,790,000)	London Paddington (4,400,000)	Bond Street (3,930,000)
Woolwich	Tottenham Court Road (1,870,000)	London Liverpool Street (1,340,000)	Canary Wharf (960,000)

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Elizabeth line

The Elizabeth line is a national rail service in London and its suburbs. Its central section is new railway infrastructure that connects the mainline stations at London Paddington and London Liverpool Street with Heathrow Airport and Reading in the west, and with Shenfield and Abbey Wood in the east. More details of the Elizabeth line route along with a full route map can be found on [Transport for London](https://www.transportforlondon.com) website.

On 24 May 2022 the new rail infrastructure from London Paddington through to Abbey Wood opened to passenger services, creating new journey opportunities for passengers. At the same time existing services between London Paddington and Reading, London Paddington and Heathrow and London Liverpool Street and Shenfield were rebranded as Elizabeth line trains.

Table 2.3 Some of the new Elizabeth line stations are already amongst the busiest in Great Britain

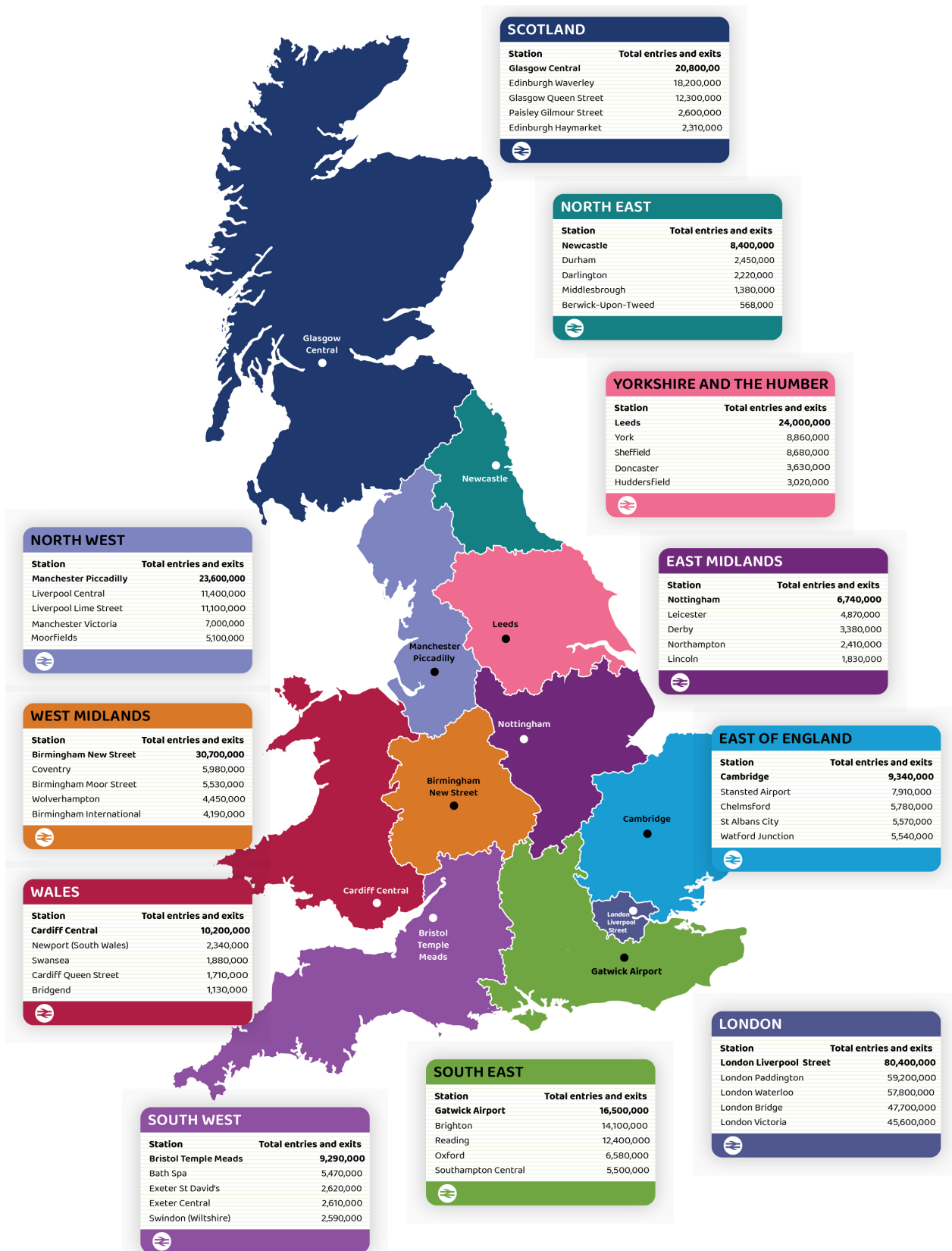
Entries and exits for stations on the central section of the Elizabeth line, April 2022 to March 2023

Station name	Served by	Entries and exits (all services)
London Paddington	Elizabeth line and other national rail services	59,200,000
Bond Street	Elizabeth line only (station opened 24 October 2022)	19,400,000
Tottenham Court Road	Elizabeth line only	34,900,000
Farringdon	Elizabeth line and other national rail services	31,500,000
Liverpool Street	Elizabeth line and other national rail services	80,400,000
Whitechapel	Elizabeth line only	23,300,000
Canary Wharf	Elizabeth line only	9,920,000
Custom House	Elizabeth line only	5,270,000
Woolwich	Elizabeth line only	8,340,000
Abbey Wood	Elizabeth line and other national rail services	7,120,000

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Stations with the most entries and exits by region

Figure 2.5 Top five most used stations in each region in England, Wales and Scotland, 1 April 2022 to 31 March 2023



Estimates of station usage April 2022 to March 2023

The most used station in each region in the latest year was the same as in the previous year, except in London where Elizabeth line usage has moved London Liverpool Street to the top and in the South East where the continued recovery in international travel saw Gatwick Airport return to the most used station, as it was in the years prior to the pandemic.

The top five most used stations were the same in eight out of eleven regions as in the previous year, and in the same order in seven regions. Each of the three regions that had a change only had one different station in their top five.

In comparison to before the pandemic (April 2019 to March 2020) only London has seen a change in the most used station.

3. Flows between stations

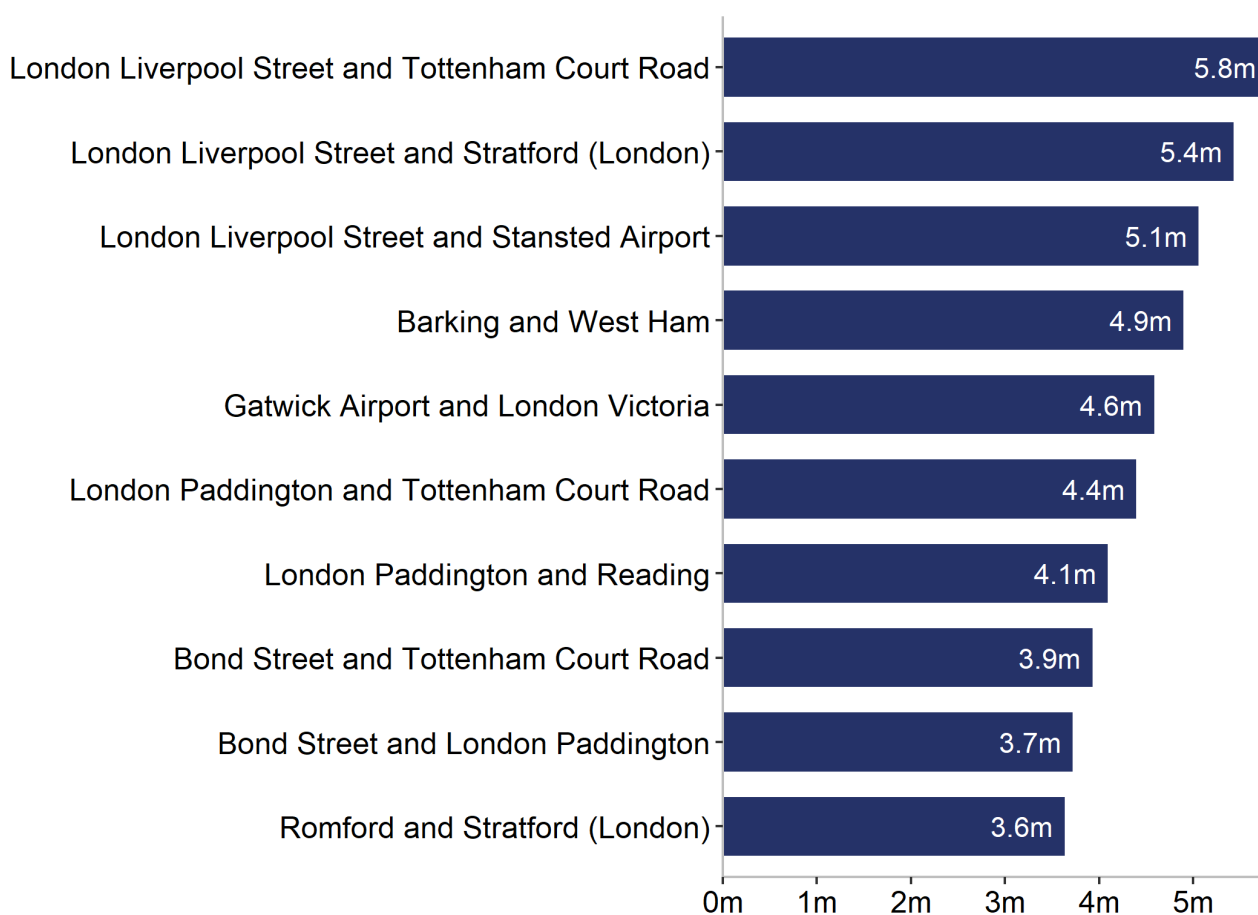
A flow represents all journeys, in both directions, between a pair of stations.

Busiest flows between pairs of stations

In the latest year, the busiest flow with 5.8 million journeys was between London Liverpool Street and Tottenham Court Road.

Figure 3.1 Four of the ten busiest flows are on routes only served by the Elizabeth line

Ten busiest flows between pairs of stations in Great Britain, April 2022 to March 2023



Four of the ten busiest flows on are on routes only served by the Elizabeth line, these are between London Liverpool street and Tottenham Court Road (5.8 million journeys), between London Paddington and Tottenham Court Road (4.4 million journeys), between Bond Street and Tottenham Court Road (3.9 million journeys) and between Bond Street and London Paddington (3.7 million journeys).

Elizabeth line journeys will also be included in journeys between London Liverpool Street

and Stratford (London) and between London Paddington and Reading, however both of these flows are also served by other operators.

The flow between Stansted Airport and London Liverpool Street is the third busiest flow with 5.1 million journeys and the flow between Gatwick Airport and London Victoria is the fifth busiest flow with 4.6 million journeys. Heathrow Airport has three mainline rail stations, and across all three there were 5.7 million journeys in total between Heathrow Airport and London Paddington. Of which, 3.3 million were to or from Terminal 2 and 3, 0.6 million were to or from Terminal 4, and 1.8 million were to or from Terminal 5.

Figure 3.2 The busiest flows including at least one station outside of London are all taking passengers to or from the capital

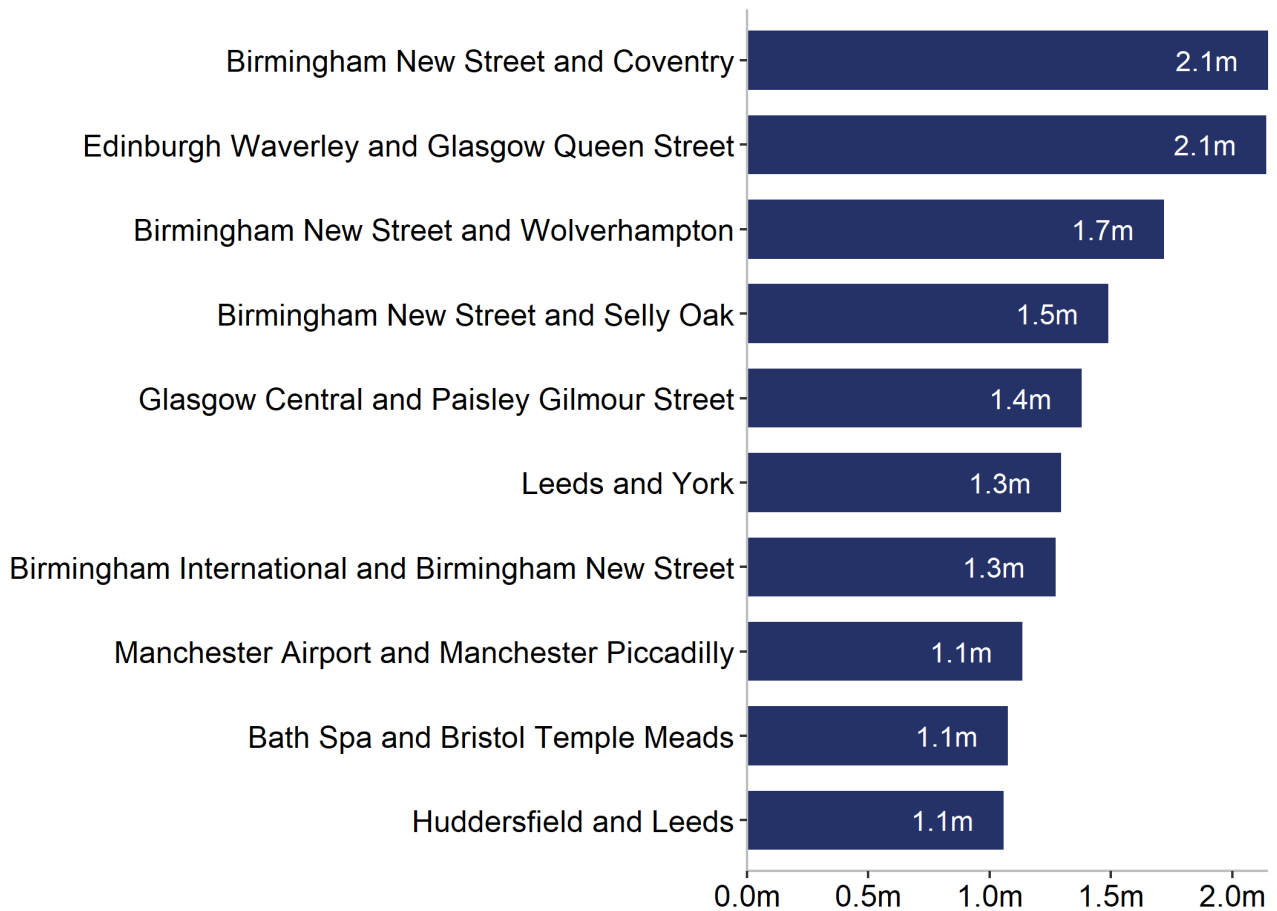
Ten busiest flows where at least one station is outside of London, April 2022 to March 2023



When only considering flows which involve at least one station outside of London, the busiest two flows were the flows described above between central London terminals and Stansted and Gatwick Airports.

Figure 3.3 The busiest flow outside of London was between Birmingham New Street and Coventry

Ten busiest flows where neither station is in London, April 2022 to March 2023



In the latest year, the busiest flow to include no London stations was between Birmingham New Street and Coventry (2.1 million journeys) followed by between Edinburgh Waverley and Glasgow Queen Street (also 2.1 million journeys). The busiest flow to include a station in Wales was the 0.9 million journeys between Cardiff Central and Newport.

4. Station interchanges

Stations with the most interchanges

An interchange is where a passenger needs to transfer from one train to another during their journey from origin to destination station.

In the latest year, the station with the highest number of interchanges was **Clapham Junction** with **19.1 million**. This station has had the highest number of interchanges each year since the comparable time series began in April 2004.

These estimates are made using a model which makes assumptions about the route taken travelling between specific origins and destinations and whether that route includes one or more interchanges. For April 2022 to March 2023, we have not been able to include routes involving the central section of the Elizabeth line, therefore interchange statistics for these stations will only include interchanges to or from services from other operators. Therefore the interchange statistics at these stations are underestimates in the latest year.

Further information can be found in Annex 1 of this release and in the [Quality and methodology report](#).

5. Annexes

Annex 1 – Quality and methodology

Data sources and methodology

These statistics on station usage are estimates primarily based on ticket sales, sourced from LENNON (Latest Earnings Networked Nationally Over Night), the rail industry's ticketing and revenue system and local ticketing data. These data sources and the methodology used provide the best approach possible given Great Britain does not have a fully gated rail network or robust count data for every station.

Lennon data feeds into a base matrix which is an input into the MOIRA2.2 rail planning tool. This is supplemented by local ticketing data for Passenger Transport Executive (PTE) areas. These sources are combined, and further adjustments are made to the data to address known issues with the MOIRA2.2 base matrix. These include an allocation of tickets sold to 'London Terminal', allocation of demand between individual stations in group stations outside of London and a number of cases where adjustments are made to selected stations to account for specific known issues, for example Digby and Sowton. Further information on the data sources and adjustments used to estimate usage at individual stations can be found in [Table 1410](#) (column L).

Since the opening of the central section of the Elizabeth line, there has been a known issue with LENNON overestimating contactless and Oyster Pay As You Go (PAYG) journeys on the Elizabeth line. To correct for this we have used data supplied by Transport for London (TfL) as a direct replacement for these ticket types in the LENNON data.

The resulting dataset is used to produce the Origin Destination Matrix (ODM), a comprehensive matrix of passenger flows throughout Great Britain. The ODM is then used to derive estimates for the number of entries and exits at each station.

Interchanges at stations have been estimated by combining the number of journeys made on each flow (from the ODM) with the information on passenger journeys taken from the Central Allocations File (CAF). The CAF is an output of the ORCATS (Operational Research Computerised Allocation of Tickets to Services) system which predicts passenger choices of rail route and train used.

Limitations

As the estimates of station usage are primarily based on ticket sales, there are a number of limitations that users should be aware of:

- Some ticket sales (e.g. Eurostar tickets) are not included, which may mean that usage at some stations is underestimated.

- Journeys with no associated ticket sales such as staff travel, and particularly fare evaders, are not included.
- Ticket sales data does not always specify precise journey origins and/or destinations, so these are estimated using alternative data sources.
- Methodology improvements, e.g. inclusion of ticket sales previously not available, means that estimates are not always comparable over time. Improvements should be taken into account when considering changes in usage between years.
- Assumptions are made about the number of journeys made with multi-use tickets e.g. that each weekly season ticket will be used to make 10.3 journeys.
- Passengers may purchase tickets from/to different stations to the ones they use in practice, e.g. to stations at the end of the fare zone.
- For April 2022 to March 2023, interchange statistics for stations on the central section of the Elizabeth line are underestimates. They only include interchanges to or from services from other operators. This is due to Elizabeth line interchanges being excluded from the December 2022 CAF file.

Methodology changes

Whilst consistency with past datasets is important to enable comparisons to be made over time, users have indicated that they are keen to see improvements in station usage estimates, even where this reduces consistency with historic data, provided any changes are clearly explained.

Key methodology changes made for the April 2022 to March 2023 ODM and their impact on station usage estimates are listed below. These changes have had a significant impact on many stations (both inside and outside of London), therefore should be carefully considered when comparing estimates with previous years, and is the reason we have not included previous year's data in Table 1410.

- Split ticketing is where a passenger completes a single journey using two or more tickets. In previous years total entries and exits at some individual stations will be significantly over estimated due to some passengers not boarding or alighting at the split point and instead staying on the train. In our previous release covering April 2021 to March 2022 we identified the following common ticket split points: Basingstoke, Croydon BR (East Croydon and West Croydon), Didcot Parkway, Doncaster, Gatwick Airport, Leeds, Milton Keynes Central, Peterborough, Sheffield, and York.

Rail Delivery Group have developed an algorithm to detect split tickets, and we have incorporated the output of this into our data processing. Therefore, in the latest year (April 2022 to March 2023) we only count an entry and exit at the start of the journey and end of the journey, whereas previously an entry and exit would have been recorded at each split point station along the way.

- An updated distribution has been used for allocating journeys for passengers who have bought non-travelcard tickets with a destination of London Terminals, for example Oxford to London Terminals. The new distribution uses modelled data from the December 2022 CAF to allocate flows to each station based on possible travel routes. Previously these were allocated using results from the 2001 London Area Travel Survey (LATS). While many allocations to London Terminals will be similar to when the LATS took place, some will have changed significantly (e.g. due to the impacts of Thameslink). This represents a significant methodological improvement.
- An updated distribution has been used for allocating journeys using West Yorkshire Metro tickets. The new distribution uses latest year (April 2022 to March 2023) data (replacing the April 2021 to March 2022 data), better reflecting post-pandemic travel patterns.
- The methodology for calculating concessionary demand in the Greater Manchester region has been updated. A new data source was available (rail surveys undertaken in August 2023) which covered all ticket types (including concessions on radial Manchester rail routes). Previously survey data from 2017 was used. This data is to estimate the proportion of concessions across all ticket types to account for concessionary travel that would otherwise not be covered by the ticket purchase data.

Further information is provided in the [Quality and methodology report](#).

Revisions

There have been no revisions to previously published data. Details on any previous revisions can be found in the [Revisions log](#).

Further details on data collection, the methodology used to calculate the estimates within this release and limitations of these estimates can be found in the [Estimates of station usage quality and methodology report](#) and [Frequently Asked Questions document](#).

How these statistics can and cannot be used



- Monitoring the number of annual entries and exits or interchanges at individual stations e.g. to understand demand
- Monitoring how usage at individual stations changes over time (subject to methodology changes) and insights as to why
- Comparing the relative usage of stations within local areas, regions or across the whole of Great Britain
- To gauge the use of different ticket types at individual stations e.g. season vs reduced



- Monitoring passenger rail usage at a national level, by train operating company or by ticket type (refer to [Passenger rail usage statistics](#))
- Monitoring the number of passenger journeys between and within regions (refer to [Regional rail usage statistics](#))
- Volume of entries compared to exits at an individual station (methodology makes these equal)

Annex 2 – List of outputs associated with this release and other related statistics

Data tables and other outputs

All data tables and other outputs associated with this release can be found on the [Estimates of station usage page](#) on the data portal.

- (a) Passenger entries and exits and interchanges by station (April 2022 to March 2023) – [Table 1410](#) (ods and csv)
- (b) Time series of passenger entries and exits and interchanges by station (April 1997 to March 1998 to April 2022 to March 2023) – [Table 1415](#) (ods)
- (c) Interactive dashboard (Power BI)
- (d) Animated graphics (MP4) and infographics (PDF)

Other related statistics

The ODM which contains the estimated number of journeys between each pair of mainline stations in Great Britain during April 2022 to March 2023 will be published on the Rail Data Marketplace in February 2024, following the release of our Regional Rail Usage publication. The ODM [covering April 2021 to March 2022](#) is available to download.

We publish [Passenger rail usage statistics](#) on a quarterly basis. These statistics include estimates of the number of passenger rail journeys in Great Britain, by sector (London and the South East, Regional, and Long distance), by operator and by ticket type. This publication also includes statistics on passenger kilometres and train kilometres.

We also publish annual statistics on [Regional rail usage](#), which includes the number of rail journeys between and within regions. These statistics are also derived from the ODM used to produce these statistics, i.e. primarily based on the LENNON ticketing system and local ticketing data.

Network Rail publishes information on [station footfall at 18 Network Rail managed stations only](#). These data are collected using a different method to the statistics in this release and include all people using the stations, e.g. visiting shops and restaurants who may not make a rail journey.

The Department for Transport (DfT) publishes [Rail passenger numbers and crowding statistics](#) providing information on the number of passengers travelling by rail into and out of major city centres in England and Wales. The statistics represent passengers on National Rail services on a 'typical' weekday. DfT also publish [daily estimates of transport use by mode](#).

Annex 3 – ORR’s statistical publications

Our statistical practice is regulated by the Office for Statistics Regulation (OSR). OSR sets the standards of trustworthiness, quality and value in the [Code of Practice for Statistics](#) that all producers of official statistics should adhere to. You are welcome to contact us directly with any comments about how we meet these standards by emailing rail.stats@orr.gov.uk. Alternatively, you can contact OSR by emailing regulation@statistics.gov.uk or via the OSR website.

Statistical Releases

This publication is part of ORR’s ‘[accredited official statistics](#)’, which consist of seven annual publications: **Estimates of station usage; Rail industry finance (UK); Rail fares index; Rail safety statistics; Rail infrastructure and assets; Rail emissions; Regional rail usage**; and four quarterly publications: **Passenger rail performance; Freight rail usage and performance; Passenger rail usage; Passenger rail service complaints**.

ORR also publishes a number of other official statistics, which consist of five annual publications: **Common Safety Indicators; Passenger satisfaction with complaints handling; Train operating company key statistics; Occupational health; Rail statistics compendium**; and four quarterly publications: **Signals passed at danger (SPADs); Delay compensation claims; Disabled Persons Railcards (DPRC); Passenger assistance**.

All the above publications are available on the [data portal](#) along with a list of [publication dates](#) for the next 12 months.

Accredited official statistics

Accredited official statistics are called National Statistics in the Statistics and Registration Service Act 2007. They are official statistics that have been independently reviewed by the Office for Statistics Regulation and found to comply with the standards of trustworthiness, quality and value in the Code of Practice for Statistics.

Estimates of station usage statistics were [independently reviewed by OSR](#) in November 2020 and [their accreditation was confirmed](#) on 1 December 2020.

The majority of our other [statistical releases were independently reviewed by the OSR in June 2012](#). They comply with the standards of trustworthiness, quality and value in the [Code of Practice for Statistics](#) and are labelled accredited official statistics.

Since our review we have improved the content, presentation and quality of our statistical releases. In addition, in July 2019 we launched our new data portal. Therefore, in late 2019 we worked with the OSR to conduct a compliance check to ensure we are still [meeting the standards of the Code](#). On 4 November 2019, [OSR published a](#)

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[letter](#) confirming that ORR's statistics should continue to be accredited official statistics. OSR found many positive aspects in the way that we produce and present our statistics and welcomed the range of improvements made since the statistics were last assessed.

For more information on how we adhere to the Code please see our [compliance statements](#).

If you have any feedback or questions please email rail.stats@orr.gov.uk.



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