

# Action plan in response to OSR assessment of ONS admin-based population estimates

Outline of our work plan to address the recommendations of the Office for Statistics Regulation.

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## Table of contents

1. [Introduction to our action plan](#)
2. [Action plan for OSR requirements](#)
3. [Action plan for ABPE technical expert recommendations](#)
4. [Next steps](#)
5. [Cite this methodology](#)

# 1 . Introduction to our action plan

We at the Office for National Statistics (ONS) produce population and migration statistics. These support decisions and policies across our society and economy, at national and local levels, and for different communities. We produce population estimates for England and Wales, and we work alongside the devolved administrations to publish UK-wide estimates. These estimates underpin many other statistical outputs as survey weights or denominators.

We are working to improve population estimates, implementing new methods which make greater use of administrative data (collections of data maintained for administrative reasons such as registrations, referred to as "admin data"). Through this, we hope to provide more timely statistics that reflect changes in society and better meet the needs of users.

The information in this action plan outlines how we will develop population statistics over the next year and beyond. The action plan will be iterative to address and build on the requirements and recommendations from phase one of the Office for Statistics Regulation (OSR) assessment.

## Organisational context

The UK Statistics Authority strategy, [Statistics for the public good](#), sets the mission for official statistics as "high quality data and analysis to inform the UK, improve lives and build the future".

This action plan outlines our response to the OSR's requirements and provides information on when and how we will move to admin-based population statistics being our preferred official estimates providing they meet the quality standards and criteria. Today, we have published a [Quarterly update](#) which provides details of our plans to further develop population and migration statistics. This ensures that users and stakeholders have the most up to date information and an opportunity to provide views and feedback.

In an exchange of letters with the OSR, we requested an assessment of our admin-based population estimates for England and Wales against the Code of Practice for Statistics with a view to them becoming accredited official statistics. The OSR published phase one of its review of [Admin-based population estimates \(ABPE\)](#) in July 2024, together with the [Independent review of the ABPEs](#) it commissioned from Professor Arkadiusz Winiowski, University of Manchester. [The OSR letter](#) noted that the team that is leading the ABPE work is impressive, and the approach promises to deliver significant benefits for users while the reports also highlight areas for improvement. We welcome the work of OSR and Professor Arkadiusz Winiowski, as it supports us to develop these important statistics.

## 2 . Action plan for OSR requirements

This section outlines our work plan to address the Office for Statistics Regulation's (OSR) requirements. As we progress through this action plan and publish our findings, we will continue to update and provide evidence to OSR and our users. We have prioritised actions into improvements by summer 2025 and those that are longer term. Where we are not able to implement a recommendation within the given timeframe, we will state what has been accomplished and update users on our progress.

The following section lists the requirements set out by the OSR and the work we have planned to meet these requirements.

## Requirements

“Requirement 1 – To maintain public confidence in its population statistics, ONS needs to understand current dependencies between MYEs and ABPEs.

Together with key stakeholders, such as the Welsh Government, ONS should also develop and publish criteria to support its decision about when the ABPEs will replace the MYEs. The criteria should include statistical quality, operational readiness, planned evaluation and assurance processes and contingency plans, and be usefully applied to the ABPEs and MYEs.”

The decision on readiness to transition to admin-based population estimates (ABPEs) will be informed by several aspects. A critical dependency is being confident that the needs currently met through mid-year estimates (MYEs) can be met by ABPEs following transition to the new approach. This includes outputs such as internal and international migration, as well as considering the ABPEs in the context of UK population estimates. It also includes consideration of the approach to revision and the impact this will have on users of the statistics. We are working with stakeholders as we refine our plans. This includes working with all parts of the UK, including Welsh Government, other government departments, groups of experts, and local authorities. To facilitate user feedback, we will publish our proposed acceptance criteria, quality requirements and approach to revisions in early 2025. This will enable feedback before implementation.

The criteria for transition (acceptance criteria) will include statistical quality, operational readiness, assurance processes, planned evaluation and contingency plans.

“Requirement 2 – To ensure that there is sufficient oversight and leadership of the production of ABPEs in a way that is joined-up across ONS, and support the ongoing development of ABPEs, ONS should strengthen its governance structure. Work here should include establishing clearly defined decision-making responsibilities to manage any risks associated with funding, capability and prioritisation across the ABPEs production process.”

We aim to have the most appropriate governance approach and operate in line with best practice. Since the OSR review, further improvements have been made, including the introduction of responsibility assignment matrices (responsible, accountable, consulted and informed) to clearly define decision making responsibilities to support risk management and prioritisation.

We plan to transition the running of the output from the research to the statistical outputs team. This will improve the sustainability and resilience of the process.

As part of the Future of Population and Migration Statistics (FPMS) Programme governance, at the beginning of the year we set up the FPMS Operations, Design and Quality Steering Group. This provides review and technical guidance on all outputs and analytical activity in the programme and is the appropriate escalation route for all analytical decisions related to the FPMS programme.

Links across the rest of the Office for National Statistics (ONS) are also being strengthened and we will continue to refine the approach.

“Requirement 3 – To improve and quality assure the methods used in the DPM in a way that supports public confidence in the ABPEs, ONS should publish a response by October 2024 detailing how it plans to address the recommendations and suggestions in Professor Winiowski’s report, and, in particular, the essential recommendations (R1-R7). Any recommendations that ONS decides not to take forward should be clearly explained within the response, setting out how it has considered the recommendation.”

This report outlines our plan to address the recommendations and suggestions in Professor Winiowski’s report, covered in more detail in the ABPE technical expert recommendations part of the action plan.

As set out in the [ABPE engagement plan](#), over the next six months we will continue to engage with users through a variety of existing and new forums to better understand their needs and listen to feedback ahead of transitioning to the new methods. This will include focused engagement with local authorities and seeking feedback on our criteria for transitioning to the new approach to estimating the population.

In addition to working with local authorities (LAs) to further develop ABPEs (and their components, such as internal and international migration), we look for input from a range of users and stakeholders, such as academics who sit on advisory panels, working groups and the [Methodological Assurance Review Panel \(MARP\)](#). We are also in the process of setting up a sub-group of MARP to provide independent quality assurance of the methods used to produce the ABPEs.

“Requirement 4 – to maximise the capability of the DPM and the quality of the ABPEs, ONS should:

- address the practical implications of incorporating new data sources into the DPM over time and ensure it is appropriately resourced
- continue with its plans to conduct sensitivity analysis to explore how the model's performance is affected by the availability and quality of different data sources"

To maximise the capability of the DPM and the quality of the ABPEs, we are developing a strategy on how new methods and data will be incorporated in the DPM. In addition, as part of the transition from research to statistical production, a change management process will be introduced. The principles underpinning this were agreed at the FPMS Operations, Design and Quality Steering Group in spring 2024.

We are developing a plan for sensitivity analysis. More information can be found in the ABPE technical expert recommendations part of the action plan.

- "review and test the capability of the DPM, at suitable intervals, to account for the integration of any novel and volatile/changeable data sources that are included in the model over time.
- implement regular fully audited assumption checking and validation to support reproducibility and to help keep the model sustainable"

We are developing a quality assurance strategy for the DPM which adheres to the principles of our [Quality strategy published for FPMS](#), and also includes additional checks reflecting the complexity of the model. These include testing the capability of the model at suitable intervals to account for the integration of novel or volatile data sources and fully audited assumption checking and validation to support reproducibility. The DPM quality strategy will be finalised by summer 2025.

We are documenting the services including the quality criteria they must meet. The DPM team is also capturing its decision-making processes. The Operational Management Service is developing an approach for recording how an output was produced so that it can be recreated from scratch if required.

"Requirement 5 – To maximise appropriate use of the ABPEs, and avoid inappropriate use of these statistics, ONS should:

- better understand the source of any bias in the SPD and introduce documented quality metrics for the DI that quantify errors (in particular, linkage errors) and any associated uncertainty that may propagate into the SPD and subsequently the DPM
- publish information on the DI, including how it is created, reviewed, updated and quality-assured”

We understand the importance of investigating the source of any bias, together with introducing quality metrics for the Demographic Index (DI) to help users understand the implications for population estimates.

The statistical population dataset (SPD) is a subset of the DI which feeds into the DPM. We have published two papers assessing the quality of the SPD, [Understanding quality of the Statistical Population Dataset in England and Wales using the 2021 Census – Demographic Index linkage](#) and [Understanding quality of linked administrative sources in England and Wales using the 2021 Census – Demographic Index linkage](#). Future research will focus on improving the stock inputs to the DPM and integration with estimation methods. We will assess the biases and limitations of this combined approach. This work will take place after summer 2025.

Work is underway on communicating the appropriate use of the ABPEs, which includes publishing information on the DI, including how it is created, reviewed, updated and quality assured. We published an [Evaluating Statistical Quality in the DI report \(PDF, 549KB\)](#), which identifies three error types that must be quantified: clustering error, data measurement error, and coverage error. Work is underway to measure false positive clustering error, and work to measure other kinds of clustering error has been planned. We have also identified further work to quantify coverage and data measurement errors in the DI and develop linkage and evaluation methods for indexing data to DI.

This work has been captured as part of the [Reference Data Management Framework \(RDMF\) Validation and Assurance framework \(PDF, 295KB\)](#) and we are making additional improvements. The Validation and Assurance Framework maps out the wider research path required for DI quality to reach its required maturity to be used for official statistics.

Although the expected timescale of this work falls after the summer 2025 publication, we do not feel that this should be a barrier to ABPEs becoming our preferred measure. This is because a strength of the DPM approach is that it is not reliant on a single data source, instead utilising multiple inputs with varying levels of uncertainty and balancing between them. While we believe the DPM will provide improved estimates compared with the MYEs (our research to date has shown less intercensal drift in the ABPEs), there remains the possibility that ABPEs will drift over time. The research outlined on the DI and stock measure will help to manage drift. However, we do not yet have sufficient evidence that this will be feasible and other options for providing a stock measure may need to be explored.

- “communicate and present, in a simple way, how the stock data (and other data inputs to the model) change over time, as this may affect the quality of the ABPEs and how it compares to that of other population estimates, such as the MYEs”

For the first time in July 2024 we included information on the data sources used within our [ABPE dataset](#). Going forward we will add material to show how data sources change over time and publish as part of the next ABPE publication in summer 2025. In addition, information on the strengths and limitations of the admin data sources used in production of the ABPEs will be published in 2025.

- “ensure its published quality information includes explanations of any strengths and limitations, and reflects the latest data inputs used, for example, updating to the latest version of the SPD”

The [Mid-year ABPE Quality and Methodology Information \(QMI\) report](#) was published for the first time in July 2024, covering the strengths and limitations of ABPEs. The QMI includes high level information on data sources with links to more detailed information, such as Quality Assurance of Administrative Data (QAAD) reports; work is ongoing to ensure all QAADs are published. We will continue to review and update the QMI report to ensure it stays relevant.

“Requirement 6 – to audit the ABPEs production process, understand the impact of data issues and support confidence in its approach, ONS needs to build on the principles set out in its published data quality strategy and implement an end-to-end process that will:

- fully audit and document the process and methods applied at each stage to support cross production knowledge and capability and ensure that mechanisms are in place for various teams to discuss, log and audit any decisions or fixes that take place
- oversee and assess the quality of the data inputs separately and in stages; this should help ONS develop the quality assurance information published alongside the statistics and support users' understanding of the strengths and limitations of the ABPEs
- ensure compliance with Reproducible Analytical Pipelines (RAP) standards”

We plan to fully audit for best practice compliance and document our methods and QA processes across the ABPE production system. This work will form a crucial component in the decision on when the ABPEs become the preferred measure. To enable us to focus on the activity required to transition to ABPEs becoming the preferred measure, we will not publish provisional ABPEs this winter to allow time to ensure this work is completed and adequately handed over to the statistical outputs team.

Significant improvements to the code have already been made and the team are currently working on further refinements to ensure that code meets best practice and is well documented. In addition, information on the strengths and limitations of the admin data sources used in production of the ABPEs will be published in 2025. The handover of the production of the ABPEs will be accompanied by the implementation of a formal quality management plan covering statistical quality at each stage of the end-to-end process.

We have also set up a data quality management forum to ensure that all teams involved in the production of the ABPEs are aware of the quality assurance findings and that appropriate actions are taken as a result.

The importance of robust code to support reproducible analytic pipelines has been recognised in the design of the FPMS system and a service has been included to support this. We will continue working with the Methodology and Quality Directorate (MQD), to further develop the DPM code to meet the published reproducible analytical pipelines (RAP) standards.

“Requirement 7 – to help users understand how to use the ABPEs, ONS should implement and publish a revisions policy, and as part of its development:

- carry out and publish a revisions analysis of the ABPEs to date, including how data input and methods differences may impact the scale of any revisions
- clarify how the model will be able to take account of any changes in methods over time as part of producing an ABPE back series
- seek feedback and input from users and key stakeholders about its proposals and involve them in its decision-making”

We have developed a revision policy proposal which is being shared for discussion with users to ensure it is clear and meets their needs. We will hold focus groups to further gather feedback and understand any impacts ahead of publishing an update on plans for how revisions will be managed in the admin-based population and migration system. Under this proposal we will publish revisions analysis going forward. We plan to publish our proposed revisions policy for feedback in early 2025.

“Requirement 8 – to instil confidence in the ABPEs and ensure that the DPM methods are sound and subject to sufficient independent and external challenge, ONS should:

- continue with its plans to create a sub-group of its Methodological Assurance Review Panel (MARP; the independent panel used by ONS to provide advice and assurance on methods used to produce official statistics)
- create and implement an expert user group
- make it easier for users to find relevant MARP papers to support technical user understanding of the methods used in the DPM”

We are setting up a sub-group of MARP, the independent panel used by the ONS to provide advice and assurance on methods used to produce official statistics, to ensure DPM methods are sound and subject to sufficient independent and external challenge. We are in the process of appointing the panel members and are planning for the first meeting to take place this winter.

We have also undertaken a review of the structure of our external meetings and are making some changes to ensure that users are informed of our plans and have opportunities to feedback. We are confident that we have the right channels for the relevant experts to input. We have amended the purpose of the Cross-Government Demography Methodology Expert Group (DMEG) as set out in our [ABPE engagement plan](#). The terms of reference are being agreed and the first meeting is due to take place this winter.

The QMI we published in July 2024 includes information on MARP, a link to where papers are stored and a link to the most recent paper, which has a technical annex. However, it should be noted that some material in these papers is now out of date because of improvements in methods. We are planning to publish a methods guide in summer 2025 which will be kept updated on current methods over time (similar to the approach for official mid-year estimates). MARP papers will then just show developments and research over time.

“Requirement 9 – to maintain public confidence and help shape the future development of the ABPEs and manage user expectations, ONS should:



- develop and implement a user engagement strategy specific to the ABPEs. This strategy should detail specific activities and how users will be involved at various stages of the process. The approaches that have been implemented elsewhere in ONS, for example migration statistics, can serve as a good model for this
- use feedback from users to drive developments to the ABPEs whilst also being transparent about where user needs cannot be met (for example, the availability of breakdowns)
- publish regular updates on its plans for the ABPEs, including how the ABPEs form part of the wider population and migration statistics transformation, including timelines and any interdependencies”

An FPMS engagement strategy has been developed, and an [ABPE specific engagement plan](#) has been published as part of this strategy. The established groups and meetings, along with the MARP sub-group and DMEG, will learn lessons from the approach taken by migration statistics to ensure we continue to improve our engagement with users to understand their needs and where needs cannot be met explain clearly why.

Over the past few months there has also been engagement with colleagues in devolved governments and HM Treasury through ABPE working groups to take on user feedback before decisions are made. We have also presented at conferences, including the Royal Statistical Society, British Society for Population Studies and the International Census Forum. The sessions and presentations at these were well received. We are already looking to conferences and events in 2025, and how we combine our presentations with internal and external colleagues to highlight and discuss our progress on ABPEs. The feedback from these is another form of engaging and listening to users to understand their needs, an opportunity to ensure the messaging is clear and actively listen to any queries.

In May 2024 we published our [How population and migration estimates are evolving article](#), which provides an overview of upcoming population and migration publications as we make improvements and more generally provides an update on how work is progressing; the [most recent quarterly update](#) was published today.

We have a sentiment tracker tool and queries team that continue to capture user needs that will enable us to be aware and implement additional information if required. This information along with knowledge gained at expert groups will be reviewed on a regular basis to ensure our users understand the plans and have an opportunity to provide feedback.

Our [Understanding mid-year ABPEs article](#) covers the user requirements which are not currently met by the ABPEs and the plan to deal with these including splitting migration components of change, UK estimates and estimates for lower geographies. Both the [QMI](#) and understanding ABPEs article outline how feedback is obtained and how it guides our work.

Engagement is taking place with selected LAs over autumn 2024 to obtain further feedback on our methods. User feedback on the new QMI and understanding ABPEs article was requested within the documents and feedback gathered as part of the autumn LA engagement. In our [recent quarterly update](#) we provided further information on our approach to LA engagement over the coming months.

“Requirement 10 – to quality assure the ABPEs at a local level, and strengthen its relationship with users, ONS should be open to scrutiny from key stakeholders, such as LAs, and users and respond to any feedback appropriately.”

We will continue to engage with LAs on the development of the ABPEs using our established network of contacts established for Census 2021 and through ONS Local. As part of this ongoing engagement to share progress and listen to feedback, we have invited 15 LAs to work closely with us to further develop the ABPEs (and their components such as internal and international migration), along with the admin-based living arrangements. Our aim is to ensure LA users understand what we are producing, how and why and have confidence in our approach for evolving our population and migration statistics. This should help us ensure population estimates meet the needs of LAs as well as being an important aspect of our quality assurance of the new approach. It is an opportunity for LAs to help us learn about the quality of the ABPEs using their local insight and knowledge of local data sources.

The 15 LAs were chosen to represent a range of demographic characteristics such as student areas, urban and rural areas, areas with transient populations such as seasonal workers.

We also have the Central Local Information Partnership (CLIP) population sub-group that meets on a regular basis to update LAs on population and migration progress, share proposals for feedback and discuss any questions they have.



By the end of the year, we will publish LA case studies which will focus on a small number of LAs to analyse differences between ABPEs and our official estimates of the population.

We know that users find it useful to have information and statistics presented in different formats in addition to publications. As set out in the ABPE engagement plan, we will continue to deliver a schedule of webinars throughout 2025 given the positive responses from LAs around the 2024 webinars and will be exploring new ways to engage directly with people through "StatsUserNet". We welcome feedback on our approach, methodology and engagement through [pop.info@ons.gov.uk](mailto:pop.info@ons.gov.uk).

"Requirement 11 – to build trust in the new approach, ONS needs to improve the way that it communicates quality and methodology information and tailor its communication to the differing technical expertise of users of population statistics, including by:

seeking feedback on its current published quality and methodology information with a broad range of users and working together with other stakeholders across the Analysis Function."

We will continue to review and improve the way we communicate quality and methodology information and ensure it is tailored to different users with and without technical knowledge.

Feedback from users was requested within our [QMI](#) and [understanding ABPEs article](#) and also as part of user engagement events including LA engagement activities and the Central Local Information Partnership (CLIP) Population sub-group.

A methods guide is planned for the ONS website in summer 2025 which will be aimed at general users. For technical users, more detailed information will be provided as outlined under R1 in the ABPE technical expert recommendations.

- "helping users navigate to the various publications on the ONS website, for example by implementing a landing page"

We have been reviewing the ONS website in line with user need, looking at new features and functionality to improve the user experience. The aim is to ensure content is easily navigable, helping users to find, understand, explore, and act.

### 3 . Action plan for ABPE technical expert recommendations

The following technical recommendations are identified from Professor Arkadiusz Winiowski, University of Manchester as part of the [Office for Statistics Regulation \(OSR\) commissioned review](#).

"R1 – To provide a comprehensive and detailed methods guide that will ensure that the Dynamic Population Model (DPM) is reproducible. R13 – To continue developing an interactive R package containing a toy model that would demonstrate the workflow of the DPM and permit testing of (some of) the model assumptions."

We plan to address these recommendations by summer 2025 by producing different outputs targeting the needs of both our technical users and the general public. For the general public we are planning to publish a methods guide. For our technical users we plan to open source R packages with supporting technical documentation and publish an article in an academic journal.

"R2 – Provide a clear differentiation between bias and accuracy (or precision) of the data inputs and assess each data input in terms of bias and accuracy."

In future publications we will use bias and precision or variance. We will describe the error in the estimates some of which could be systematic leading to bias and some of which could be random and leading to variance. We have already done some work to understand the bias and accuracy of the DPM inputs, such as [international migration](#), as part of our work on coverage measures and uncertainty.

"R3 – To quantify in the documentation (R1) the assumptions in the model"

This recommendation refers to an old method (particle filters) which was superseded by the Template Model Builder (TMB) in December 2023. We will ensure that future documentation is clearer by specifying that the model can use multiple sources together with the uncertainty measure associated with them.

"R4 – To test and document the impact of using a coverage benchmark in the DPM"

We are working on coverage options for the SPD and once a preferred option has been identified we can consider option one (correct in the data inputs) and compare it to option two (correct in DPM through model parameters). This will be done after summer 2025.

"R5 – To analyse the sensitivity of the ABPEs"

"R6 – To continue developing a quality assurance process at each stage of producing ABPEs.

R20 – To consider a risk assessment of under- vs over-predicting population and its distribution by age, sex and local authority."

We are further developing the existing quality assurance processes for the production of the ABPEs to ensure that there is a rigorous and fully documented quality assurance (QA) process for each stage of producing the estimates.

We will address these recommendations together with requirement four in the main OSR report (to explore how the model's performance is affected by the availability and quality of different data sources) by developing a plan for sensitivity analysis. We will share this plan with the sub-group of MARP for feedback by summer 2025. The sensitivity analysis will incorporate the findings we have to date on bias and precision in the SPD and international migration.

"R7 – To provide a statement that accompanies the DPM based ABPEs on the potential sources of uncertainty or bias that are unaccounted for.

R9 – To develop a process of assessing the quality of all data inputs in terms of bias and accuracy of the data inputs for the purposes of being used in the DPM. Such a process could provide a structure for the data quality assessment (as described in R2) if data collection mechanisms change or new data sources are introduced.

R10 – To continue research to better understand the nature of errors (biases and uncertainty) in the data sources that are used as inputs to the DPM."

We will address these recommendations by documenting the current methods for assessing bias, adjusting for bias, measuring uncertainty and identifying potential additional sources of bias and uncertainty. This will be done by summer 2025. In addition, we will continue our work on the simulation studies and document our findings by summer 2025.

We will also develop a programme for dealing with additional sources of error which will be implemented beyond summer 2025.

"R8 – To continue research on the data source(s) to be used as a coverage benchmark for the admin-based data used in the DPM (to inform R4)."

We are continuing our work in researching options for coverage adjustment of the SPD. We are continuing to investigate administrative data only estimation frameworks, with a view to a conclusive decision on their viability by summer 2025. In parallel, we are also continuing to look at viability of supporting or supplementary surveys. After 2025, we will work on testing and implementing the most appropriate options using data beyond 2021.

The admin-based migration estimates (ABMEs) have adjustments associated with known (coverage) limitations in certain administrative data sources. We have quantified the uncertainty associated with these adjustments: [Measuring uncertainty in international migration estimates](#) and [Quantifying uncertainty in headline international migration estimates](#).

"R11 – To continue testing of the DPM and resulting ABPEs by using goodness of fit measures via prior and posterior predictive checks, which are a typical component of a Bayesian workflow."

We will develop a research plan for producing goodness of fit measures and we will develop the measures, compute them and analyse them by summer 2025. We will add these measures to the TMB package after summer 2025.

"R12 – To develop a comprehensive battery of tests (based on R5 and R11) that can be automatically applied to future versions of the DPM."

We will develop a proposal for automatic tests, such as for hierarchical structures in the DPM model, and include these tests in the production system by summer 2025.

"R14 – To develop an interactive dashboard."

The development and open sourcing of R package by summer 2025 will address this recommendation. We have also developed an internal PowerBi dashboard for estimates and model comparisons as well as an internal R shiny tool which can be used for model experimentation.

We will review population statistics outputs to ensure they best meet user needs. As part of this work we will explore whether new formats such as dashboards and interactive tools can better serve our audiences.

"R15 – To engage with the local authorities and government stakeholders to learn about specific characteristics of the areas and types of errors that may be present in the admin data regarding these areas."

Last month we started targeted engagement with 15 local authorities (LAs) to evaluate the strengths and weaknesses of the modelled population and migration estimates and administrative sources that feed in or could feed into these estimates. These LAs have been selected based on their previous engagement with us and their characteristics such as student populations, urban, rural or transient populations.

We also work very closely with the government departments supplying data to us. This helps us to understand the strengths and limitations of the different data sources. This work also includes collaborating with departments on potential areas of quality improvement to address limitations (for example, we are working with NHS England to further our understanding of coverage error in the Personal Demographics Service).

"R16 – To provide a justification for the current implementation of the DPM that relies on a simplified demographic assumptions because of the computational difficulties."

We will use simulations to determine the impact of the simplified demographic assumptions using multiple draws on the uncertainty of aggregate estimates by summer 2025. In the meantime, we can also test this using the Demest package but run it only once as it is very time consuming for simulation purposes.

"R17 – To continue research into methods for quantifying uncertainty in the international and internal admin-based migration statistics (ABMEs) as these are crucial to producing reliable ABPEs."

We recently submitted a paper for quantifying more of the uncertainty with ABMEs. We aim to provide more quantification of uncertainty with ABMEs with future publications of long-term international migration (LTIM) estimates. For example, by summer 2025 we will aim to provide measures of uncertainty that quantify more of the uncertainty with ABMEs.

We are using an established method for internal migration, which is a benchmark approach that quantifies uncertainty through comparison with census based internal migration estimates: [Methodology for measuring uncertainty in ONS local authority mid-year population estimates: 2012 to 2016](#).

"R18 – To maintain or develop within the ONS the capacity for implementing computational methods used in and around the DPM."

Since the beginning of this year we have worked with our external partners and with the Analytical Standard and Pipelines team in MQD to enhance our capabilities. We are continuing our upskilling and working on training materials which will be fully developed after summer 2025.

We will have full desk instructions and have proven that more people can run the process by recreating previous outputs. We will have code that follows best practice and we will have developed business and statistical continuity plans.

"R19 – To consider using other countries mirror migration statistics."

Some research of mirror statistics was done in 2021. Mirror statistics will be included within a United Nations Economic Commission for Europe (UNECE) Emigration Task Force due to start in 2025. We are planning to use mirror statistics as signal data and also as part of the methods development work for British National emigration.

## 4 . Next steps

We are committed to providing quarterly updates to this plan, to explain how requirements are progressing. We will continue to meet with OSR on a regular basis to keep them updated throughout. We also have our [population and migration quarterly update article](#) that provides the latest information on plans and progress to help keep users informed, along with all the other user engagement mentioned throughout this plan.

## 5 . Cite this methodology

Office for National Statistics (ONS), released 28 October 2024, ONS website, methodology, [Action plan in response to OSR assessment of ONS admin-based population estimates](#)