



ONS Dynamic Population Model Estimates

Population Statistics User Group

14 December 2022



Content

- Background
- Research output release
- Future
- Links



Background

- Part of ONS Transformation Programme
- Dynamic Population Model (DPM) aims to coherently combine admin data with knowledge about demographic processes
- Uses Bayesian statistical framework developed by Stats New Zealand and Southampton University



Research output release

- 23 November - data published for 14 'case study' authorities
- Selected as having distinct characteristics and challenges
 - Include: Islington, Newham, and Westminster
- Initial outputs do not incorporate data from the 2021 Census

Research outputs/case studies

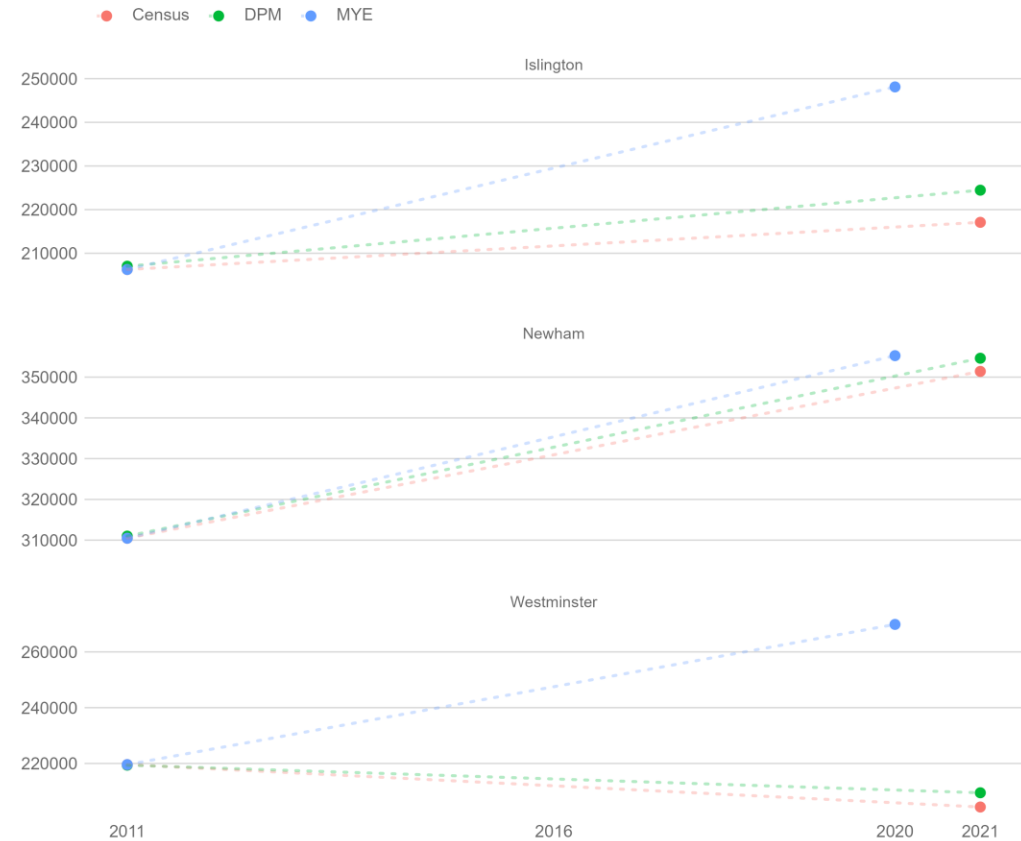
Outputs:

- Annual population and migration estimates
 - Mid-2011 to mid-2022
 - By single year of age and sex
- Credible intervals for estimates (mean + high/low bounds)

Research outputs/case studies

- DPM estimates for mid-2021 marginally higher than Census

Population estimates for start and end of decade

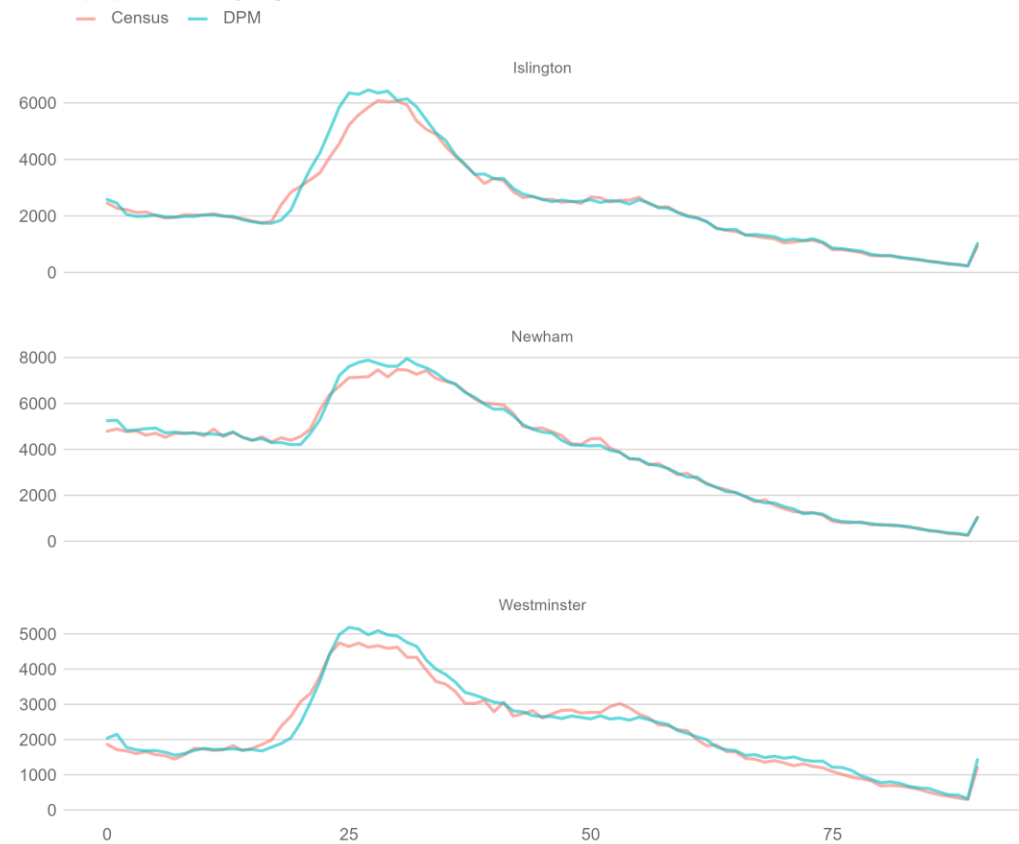


Sources: ONS 2020-based mid-year estimates; 2021 Census; ONS Dynamic Population Model research outputs

Research outputs/case studies

- DPM estimates for mid-2021 marginally higher than Census
- Differences in age structures for 18-30

2021 population by age

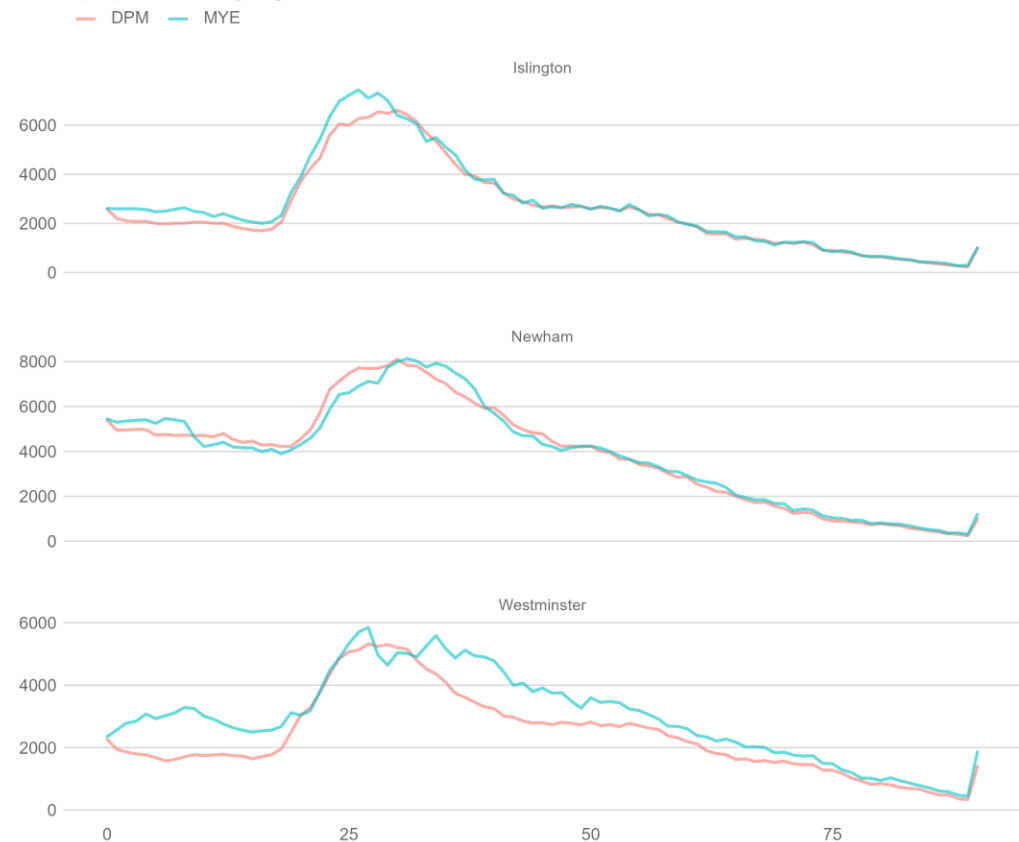


Sources: GLA modelled backseries; ONS Dynamic Population Model research outputs

Research outputs/case studies

- DPM estimates for mid-2021 marginally higher than Census
- Differences in age structures for 18-30
- But alignment is much better than existing MYE

2020 population by age



Sources: ONS 2020-based mid-year estimates; GLA modelled backseries; ONS Dynamic Population Model research outputs

Research outputs/case studies

- Trajectories broadly align with GLA modelled backseries

Annual population estimates

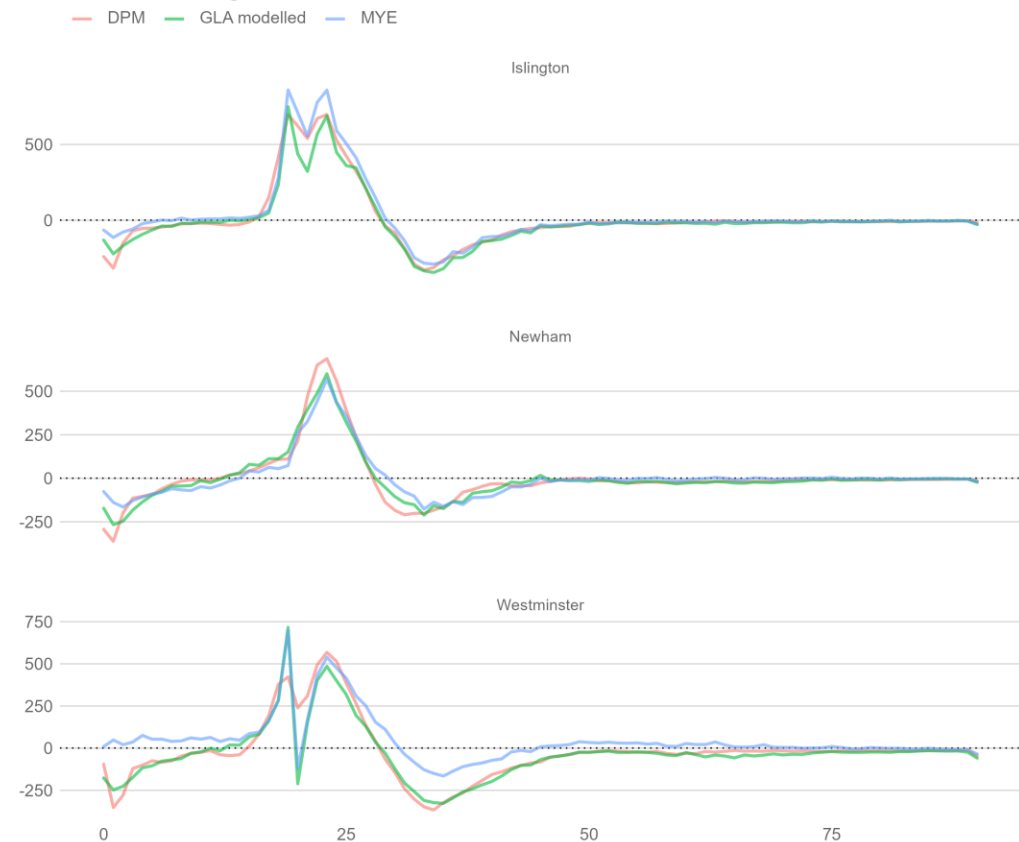


Sources: ONS 2020-based mid-year estimates; GLA modelled backseries; ONS Dynamic Population Model research outputs

Research outputs/case studies

- Trajectories broadly align with GLA modelled backseries
- Similar overall net migration age structures for DPM and GLA

Mean total net migration 2012-2020

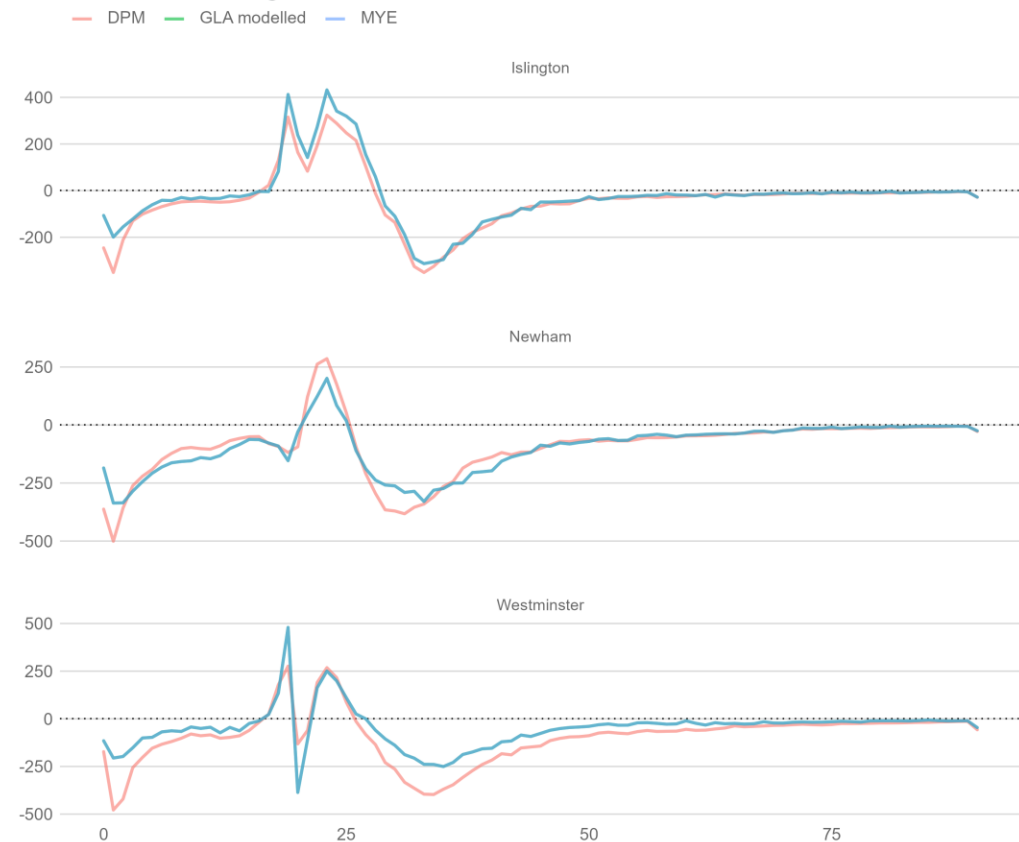


Sources: ONS 2020-based mid-year estimates; GLA modelled backseries; ONS Dynamic Population Model research outputs

Research outputs/case studies

- Trajectories broadly align with GLA modelled backseries
- Similar overall net migration age structures for DPM and GLA
- Split between internal and international very different though

Mean internal net migration 2012-2020

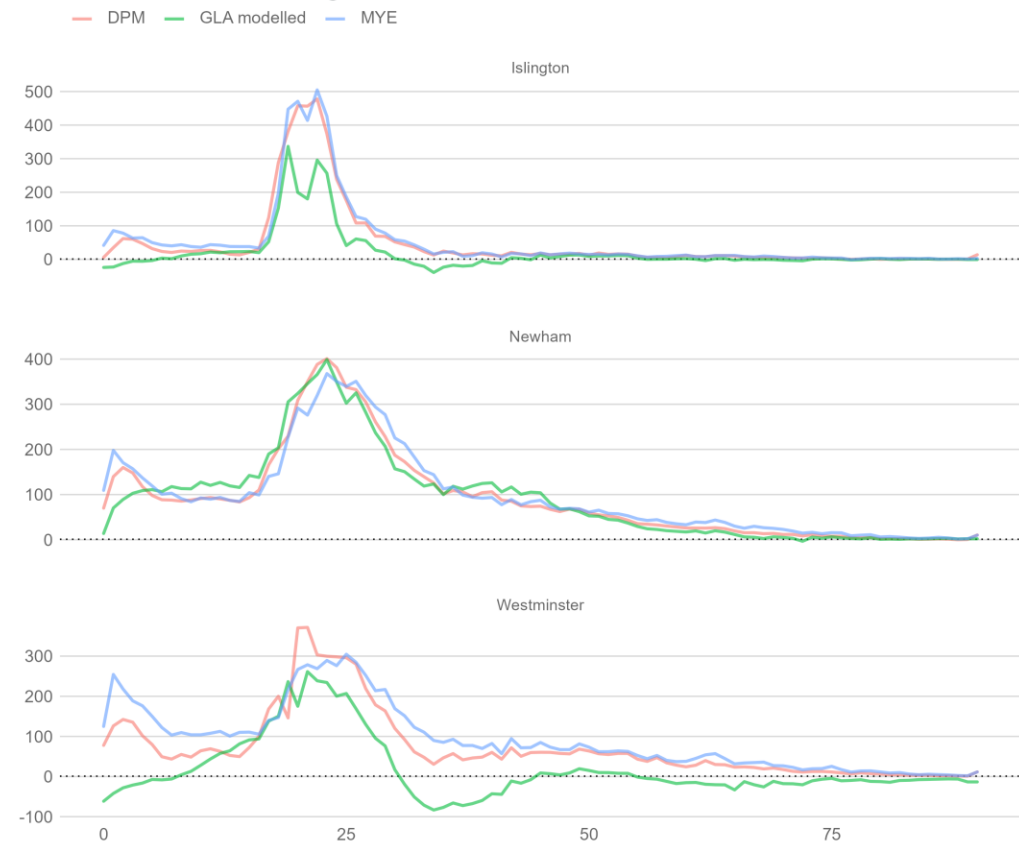


Sources: ONS 2020-based mid-year estimates; GLA modelled backseries; ONS Dynamic Population Model research outputs

Research outputs/case studies

- Trajectories broadly align with GLA modelled backseries
- Similar overall net migration age structures for DPM and GLA
- Split between internal and international very different though

Mean international net migration 2012-2020



Sources: ONS 2020-based mid-year estimates; GLA modelled backseries; ONS Dynamic Population Model research outputs

Future

- February 2023 – publish estimates for all authorities
- Estimates from DPM could *potentially* replace existing MYE
 - But depends on how good the quality of outputs is considered to be
- ONS previously suggested goal to produce monthly estimates
 - Priority seems to have shifted to quality/timeliness and outputs for alternative population bases

Links

ONS Dynamic Population Model

- [Report](#)
- [Population and migration estimates](#)
- [Credible intervals](#)
- [Overview of methodology](#)



Recent data releases



Contents

- Modelled estimates of recent births
- Births by mothers country of birth
- International migration estimates



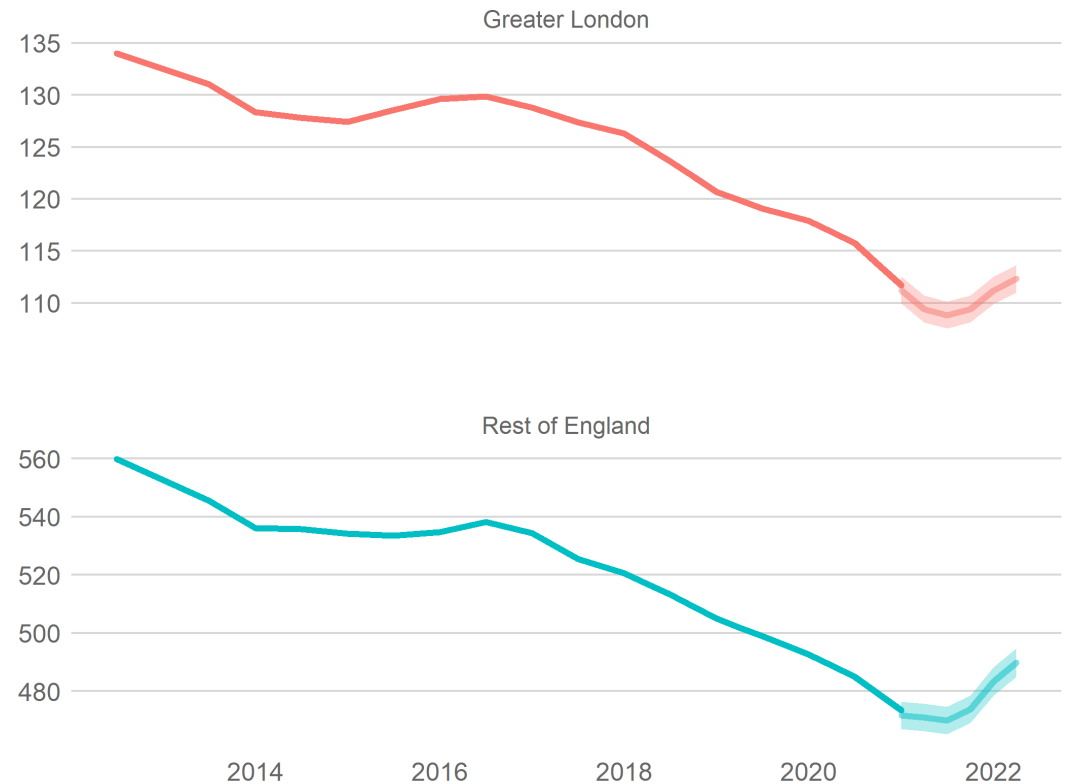
Modelled estimates of recent births

Background

- Previously presented work using GP register data to estimate recent births
- Built on 2016 research*, substituting publicly available data for commissioned extracts
- Initial results shared with borough contacts earlier this year

Birth trends to April 2022

Actual and predicted annual births (thousands)



*<https://data.london.gov.uk/dataset/estimating-births-using-gp-registration-data>

Progress since last meeting

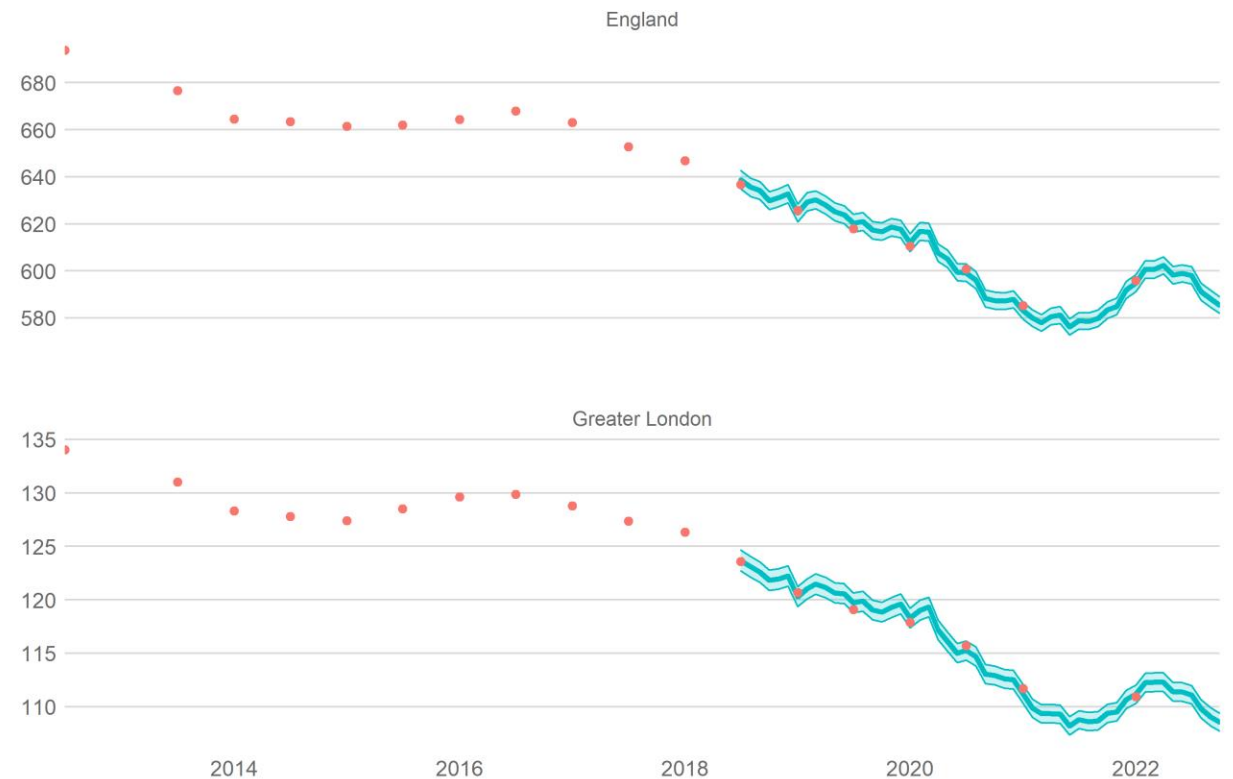
Since then:

- Can now update monthly (was quarterly)
- Results validated against official calendar year 2021 births
- Preparing to make data and code publicly available

Actual and predicted annual live births (thousands)

YE mid-2012 to October 2022

actual predicted



Annual live births by date of year ending

Sources: ONS birth estimates for calendar and mid-year periods; GLA birth estimates modelled from patient registration data

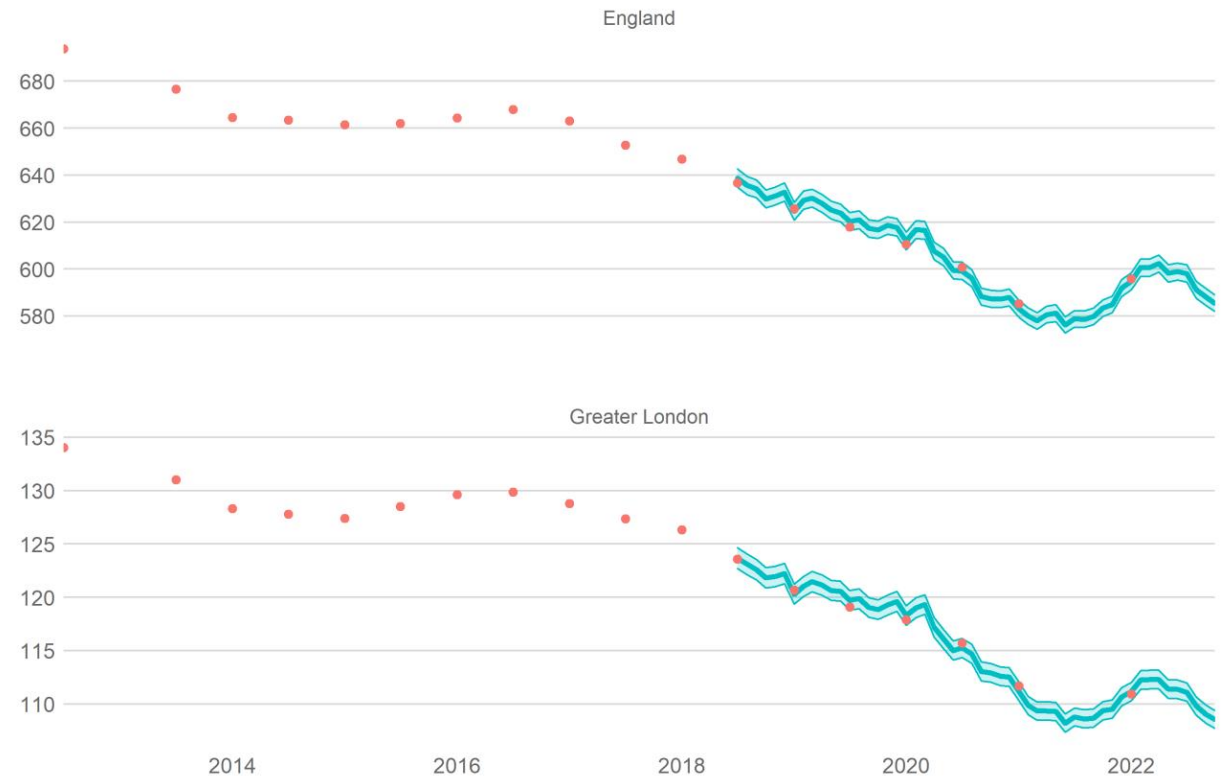
Progress since last meeting

- Latest data suggests earlier upturn in births temporary
- Consistent with family formation postponement / catch-up as result of pandemic

Actual and predicted annual live births (thousands)

YE mid-2012 to October 2022

actual predicted



Annual live births by date of year ending

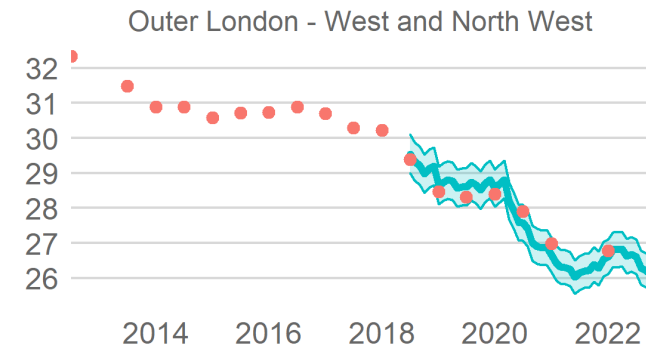
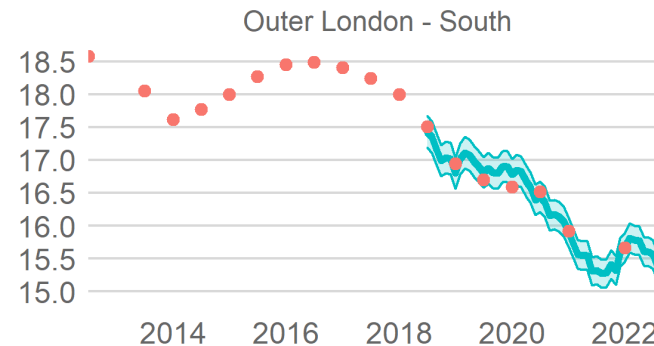
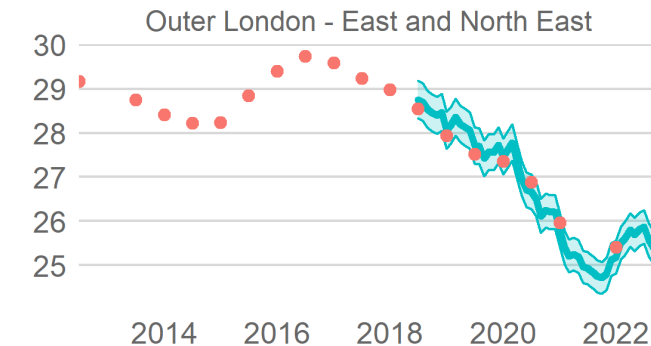
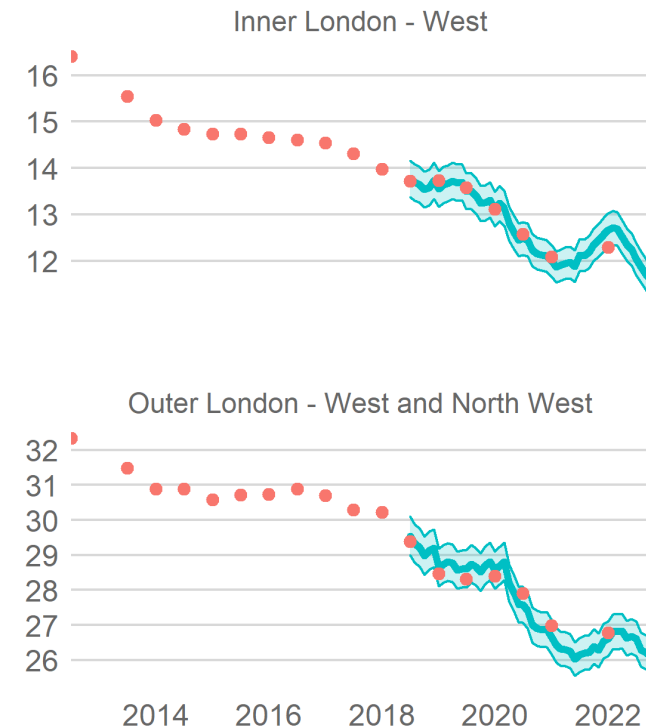
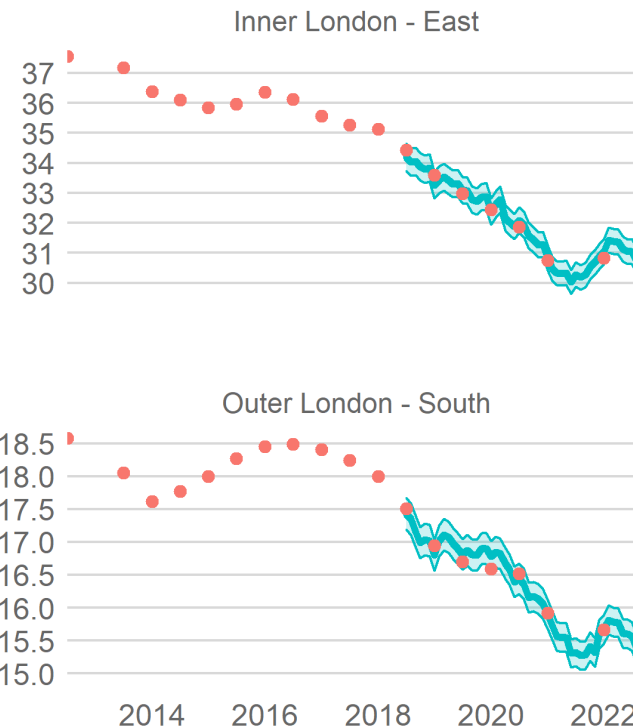
Sources: ONS birth estimates for calendar and mid-year periods; GLA birth estimates modelled from patient registration data

Pattern holds across all London subregions

Actual and predicted annual live births (thousands)

YE mid-2012 to October 2022

actual predicted



Annual live births by date of year ending

Sources: ONS birth estimates for calendar and mid-year periods; GLA birth estimates modelled from patient registration data

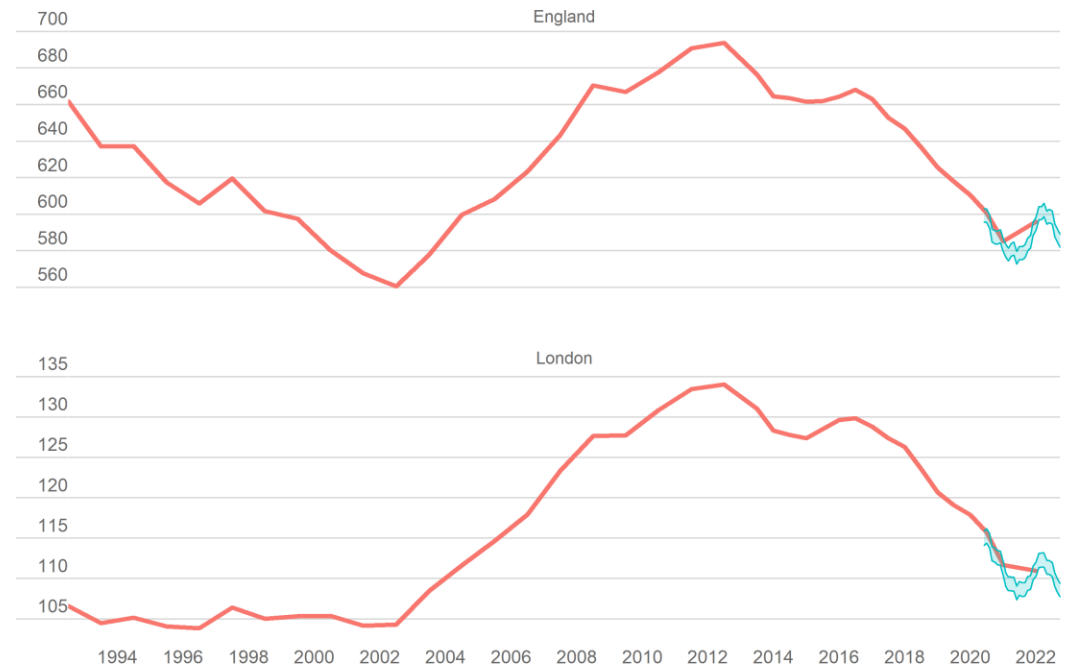
Long term trends

- Annual births now almost back to pre-boom levels
- Trends not unique to London
- But it has seen proportionally bigger changes to rest of country

Actual and predicted annual live births (thousands)

YE mid-1992 to October 2022

actual predicted



Annual live births by date of year ending

Sources: ONS birth estimates for calendar and mid-year periods; GLA birth estimates modelled from patient registration data

Published data

Outputs will be available shortly at:

- Modelled birth estimates - <https://data.london.gov.uk/dataset/modelled-estimates-of-recent-births>
- GP registration data - <https://data.london.gov.uk/dataset/patients-registered-at-a-gp-practice>
- Official birth estimates series - <https://data.london.gov.uk/dataset/annual-birth-series>

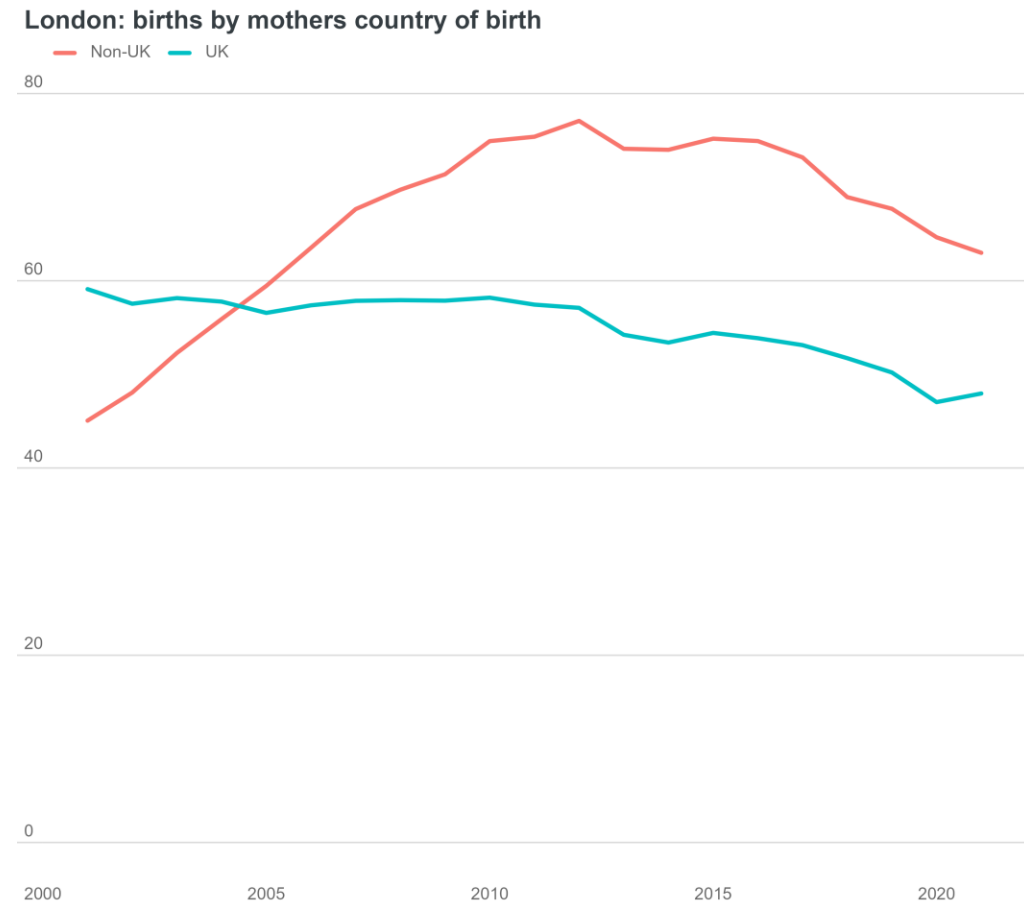
Each include links to R code used to create the data



Births by Mothers Country of Birth

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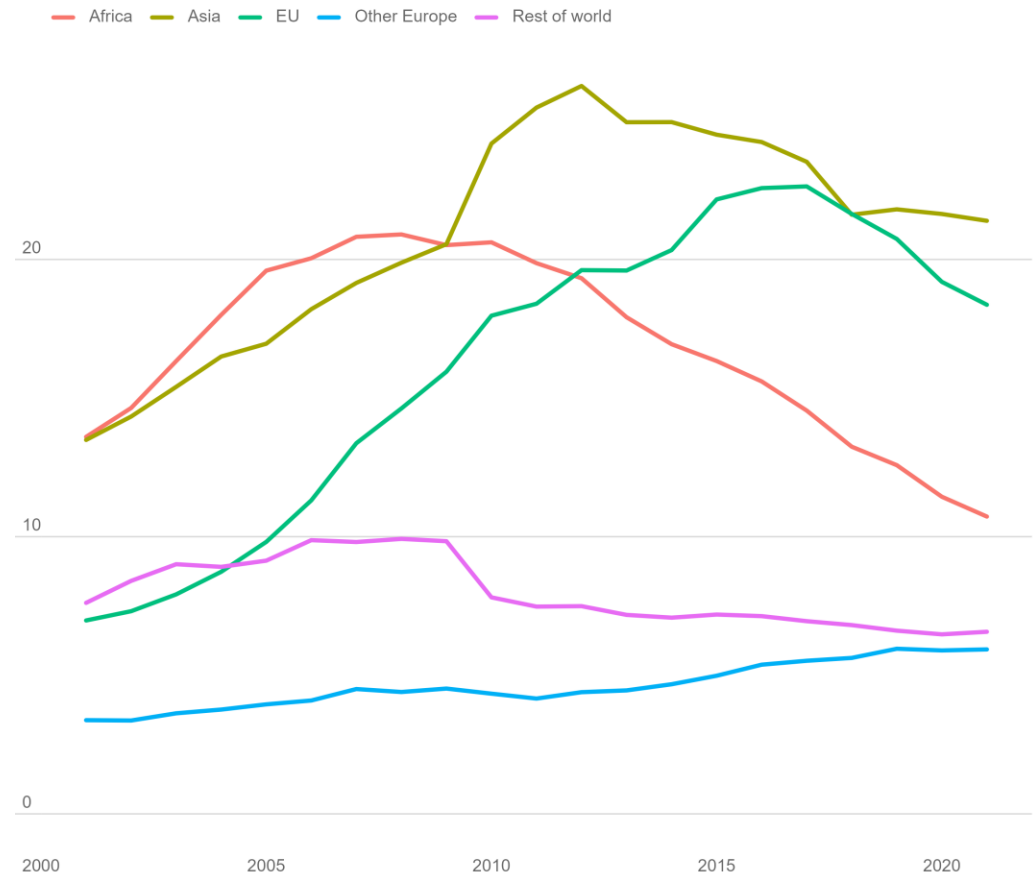
- Data for calendar year 2021 released August 2022
- Births to non-UK born mothers continued to fall
- Slight increase to UK-born mothers



Births by Mothers Country of Birth

- Births to mothers born in Africa continued long decline
- Births to EU-born mothers have been falling since 2017

London: births by mothers country of birth





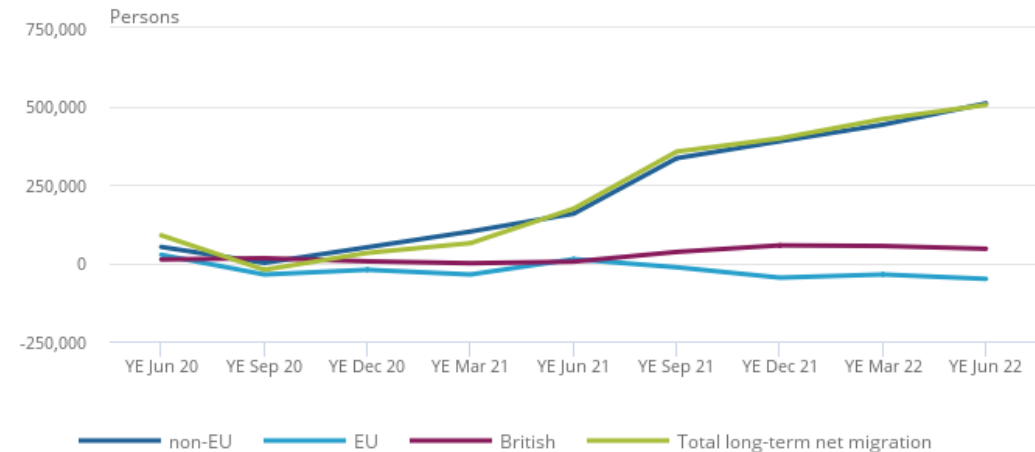
International Migration Estimates

International Migration Estimates

- ONS released provisional estimates for UK up to mid-2022
- Total net inflow **+504k**
- Highest level on record
- Net outflow of EU nationals: **-51k**
- Net inflow British nationals: **+45k**
- Net inflow of non-EU: **+509k**

Figure 4: Long-term net migration in the year ending June 2022 was largely driven by non-EU nationals

Net migration of non-EU, EU, and British nationals in the UK, between the year ending June 2020 and the year ending June 2022



Source: Office for National Statistics, Department for Work and Pensions, Home Office

International Migration Estimates

Increase in migration to the UK driven by multiple world events:

- Return of international students after lifting of travel restrictions
 - Resettlement of Afghans
 - New visa routes for BNO from Hong Kong
 - War in Ukraine
-
- One-off events??
 - Potential for level of net migration to fall substantially next year