

Statistical Transformation of the population and social statistics system in England and Wales

Louisa Blackwell

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Agenda

- Vision for transforming population and migration statistics
- Dynamic population model (DPM)
- International Migration
- Questions and comments

Future Population & Migration Statistics System in England and Wales

Strategic vision: More frequent, timely and inclusive statistics about the population and its characteristics



A social statistics system that shapes our understanding of society and people.



A system to create and share statistics that is sustainable and future proof.



A broad, flexible range of outputs and products to respond to user needs and questions of the day.

Administrative data will be at the core of this system.

The transformed outputs will include



National to local Population and Migration Statistics

Understanding
demographic
change and respond
to challenges



Population sub- groups and characteristics

Reflecting the
diversity of
populations to
local levels



Housing, accommodation and living arrangements

Understanding
who and how
people live together
in our society



Outcomes

Data assets that
allow us to
understand
population life
journeys and
outcomes

We have launched a consultation....

- In 2014, the UK Government set out its ambition that “censuses after 2021 will be conducted using other sources of data and providing more timely statistical information”
- The aim of the consultation is to understand how close our proposed system is to meeting user's needs
- The consultation closes on 26th October 2023
- Responses to this consultation will inform a recommendation on how the ONS should produce statistics about population in England and Wales in the future

Accessing the consultation

consultations.ons.gov.uk

UK Statistics Authority Office for National Statistics

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Details of consultations held before November 2016 can be found [here](#).

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Open consultations

Consultation on the future of population and migration statistics...



Closes 26 October 2023

Ymgynghoriad ar ddyfodol ystadegau ar y boblogaeth a mudo...



Closes 26 October 2023

[Welsh language questionnaire](#)

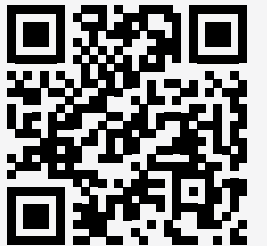
[English language questionnaire](#)

Overview of the Dynamic Population Model (DPM)

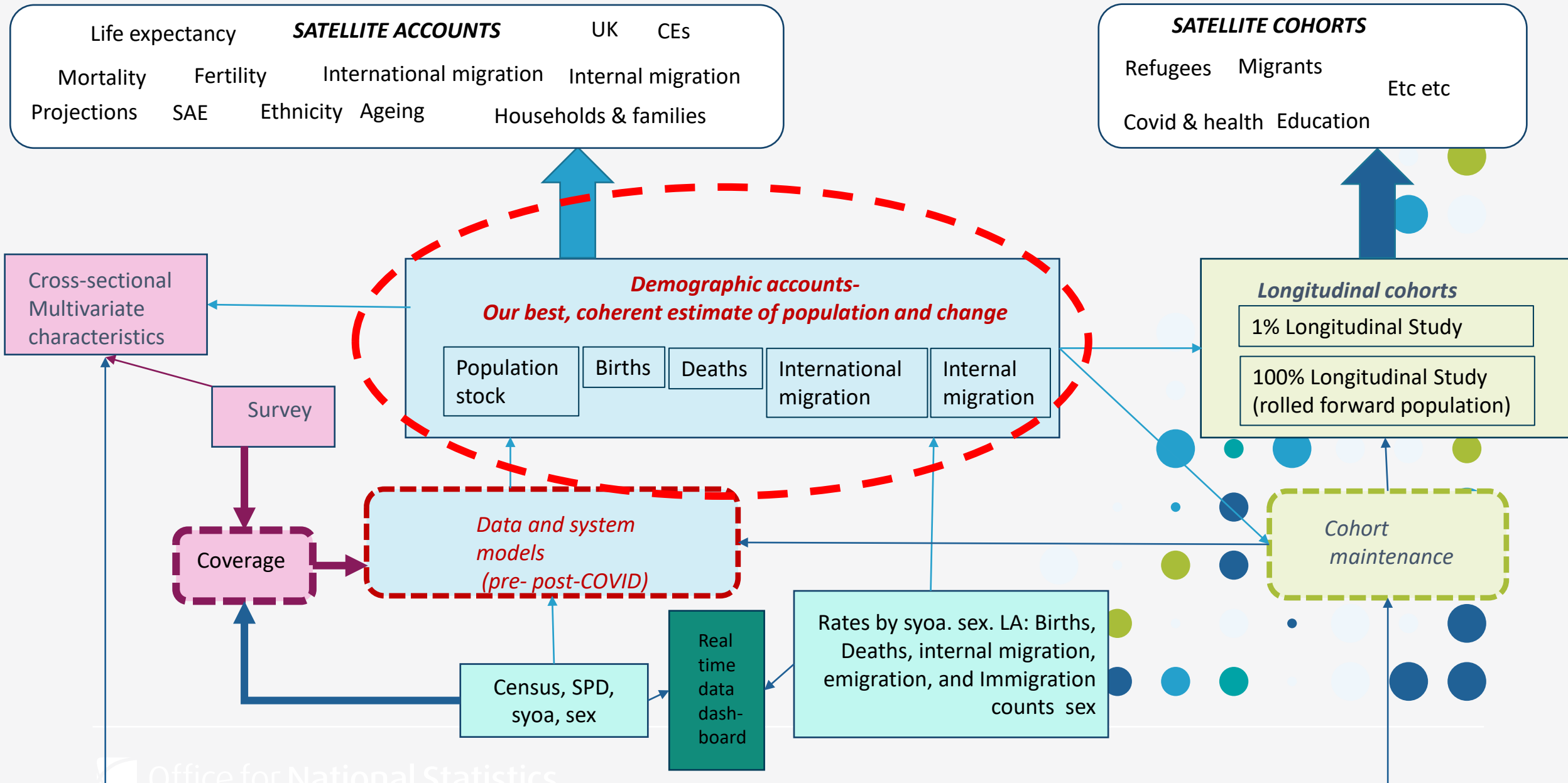


Dynamic Population Model

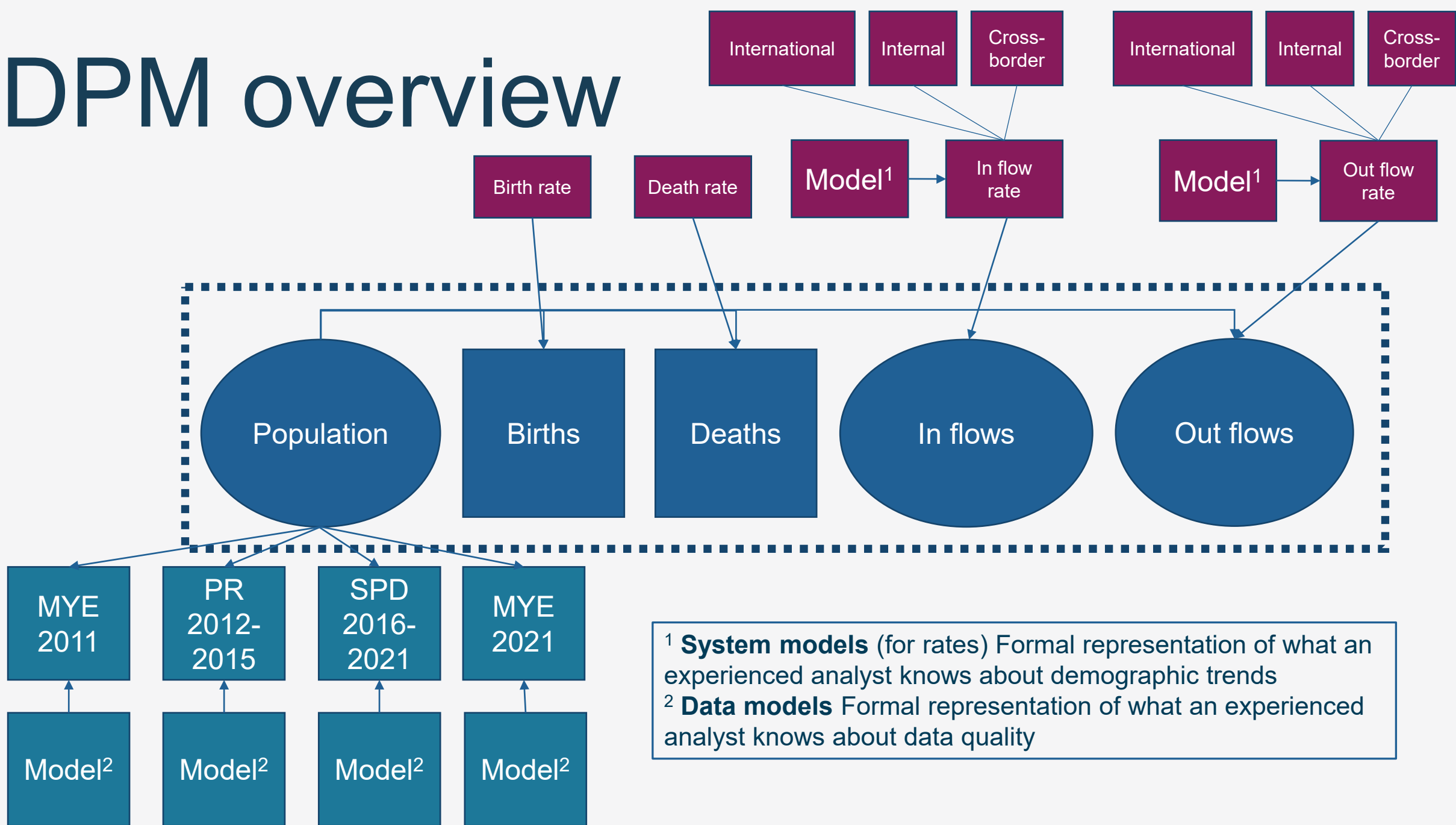
- Aim: produce estimates (including uncertainty) of population stocks and flows for single year of age, sex, year (2011-current) at Local Authority level in England and Wales using
 - Multiple data sources on population stocks and flows
 - Models of measurement error, demographic processes and the demographic identity of population change
 - Particle filters for estimation (currently)



Hybrid statistics system



DPM overview



Input data in the DPM

- **Births and deaths** from registration data (assumed exact)
- **Population stocks** (point estimates, measures of uncertainty and coverage adjustment)
 - MYE 2011 (Census 2011-based)
 - PR 2012-2015
 - SPD 2011, 2016-2022
 - MYE 2021 (Census 2021-based)
- **Smoothed superpopulation rates;** births (by mother's age), deaths, in-migration and out-migration

Plot of expected and observed rates

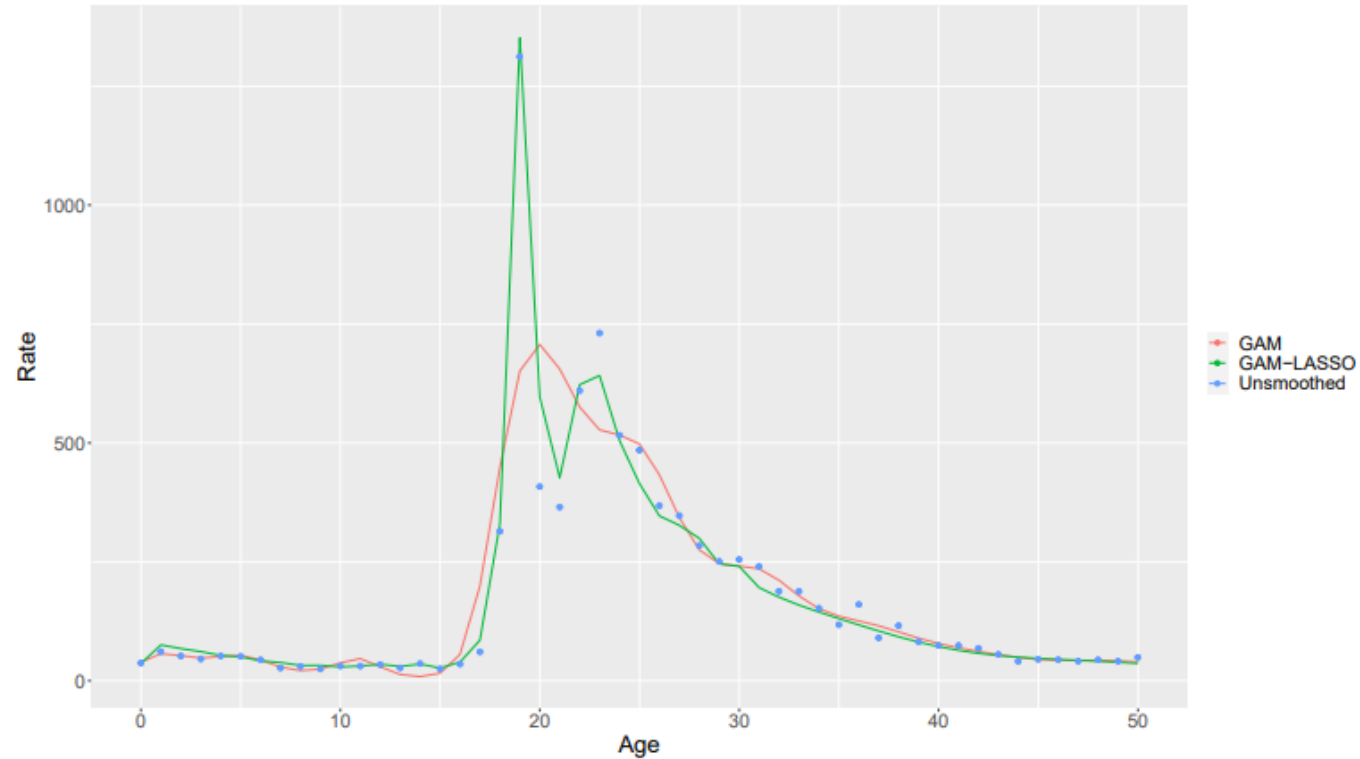


Figure 4.2: Combined in-migration for females in Cambridge ages 0-50 for the year ending 30 June 2021, observed counts (“unsmoothed”), estimates used in [ONS, 2022d] (“GAM”) estimates from equation 4.5 (“GAM-LASSO”)

Main steps for estimation

- 1. Approximate components.** Build approximations of the series for births, deaths, migration, and population. Unlike in the final account, these series do not have to be mutually consistent.
- 2. Fit system and data models.** Use the approximate series to fit models for births, deaths, and migration. The models all contain hyper-parameters, which are kept, and rates, which are discarded. Similar calculations, based on the approximate series for births, deaths, migration, and population, are also done for data models.
- 3. Estimate individual accounts and rates.** Using the hyper-parameters and the raw data, (re-)estimate demographic accounts and rates. Each Local Authority is estimated independently (conditional on the hyper-parameters and data).
- 4. Combine accounts, derive migration.** Combine the individual accounts into a unified account for all of England and Wales. As part of this process, derive values for all migration flows between Local Authorities, and between all Local Authorities and the outside world.

Data models: estimate coverage ratios

- **2011-based**

- Ratio of MYE-2011 to admin source in 2011 by single year of age, sex, LA.
- GAM used to smooth over age profile, independently for sex and LA

- **2021-based**

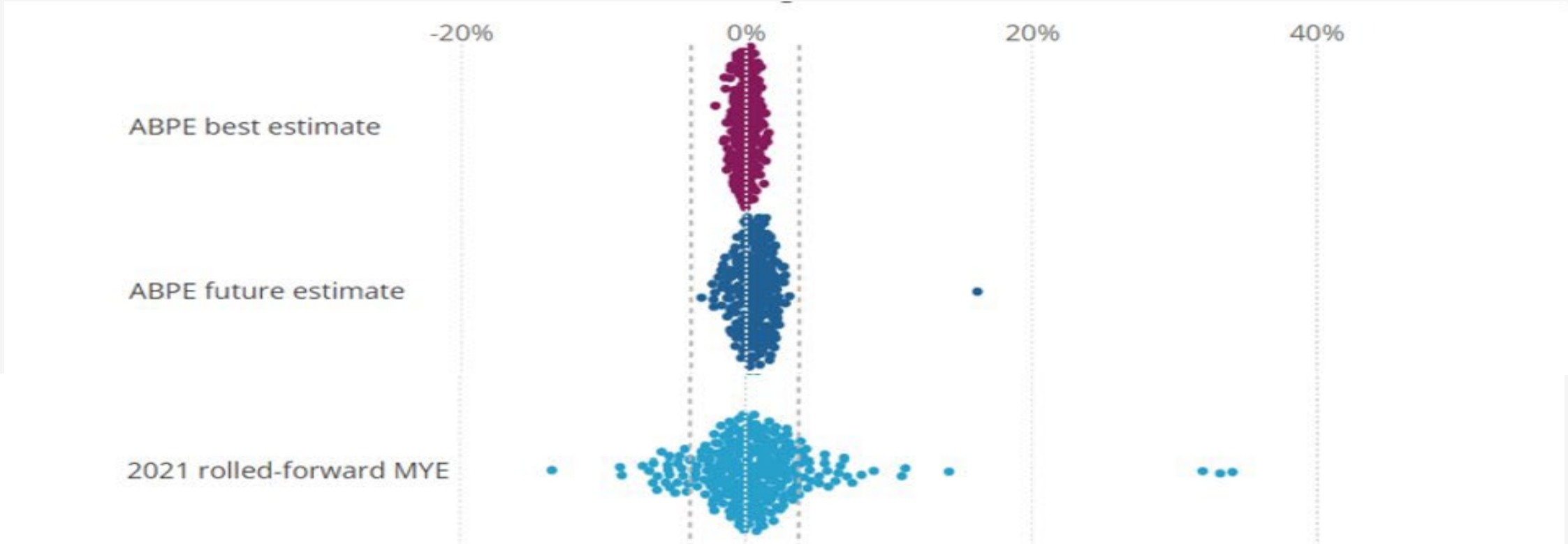
- ratio of MYE-2021 to admin source in 2021 by single year of age, sex, LA.
- GAM used to smooth over age profile, independently for sex and LA

- **Interpolated (a proxy for a robust coverage adjustment)**

- Linear interpolation between 2011 and 2021 by single year of age, sex, LA.
- Plan to use 2022 and 2023 ratios equal to 2021 ratios for next publication (assumption under review)

- **Future robust coverage adjustment being developed and is vital**

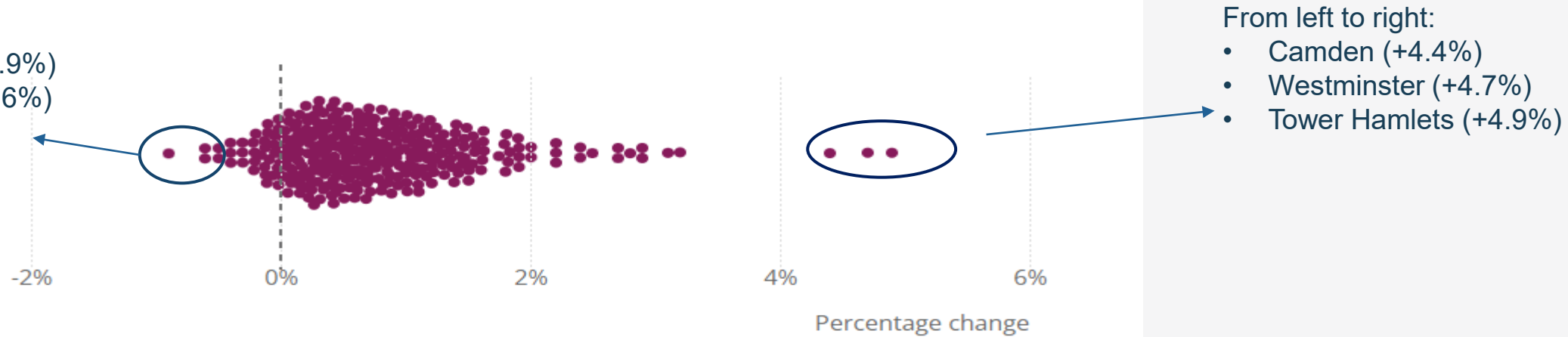
Comparison of local authority estimates:2021



What do ABPEs show about 2021/22 population change? As expected, largest growth is in London. Estimates produced 4 months ahead of planned official estimates

Figure 1: The largest changes in population between 2021 and 2022 are in London local authorities

Percentage change in total local authority population from June 2021 to June 2022



Source: Office for National Statistics – ABPE best estimates

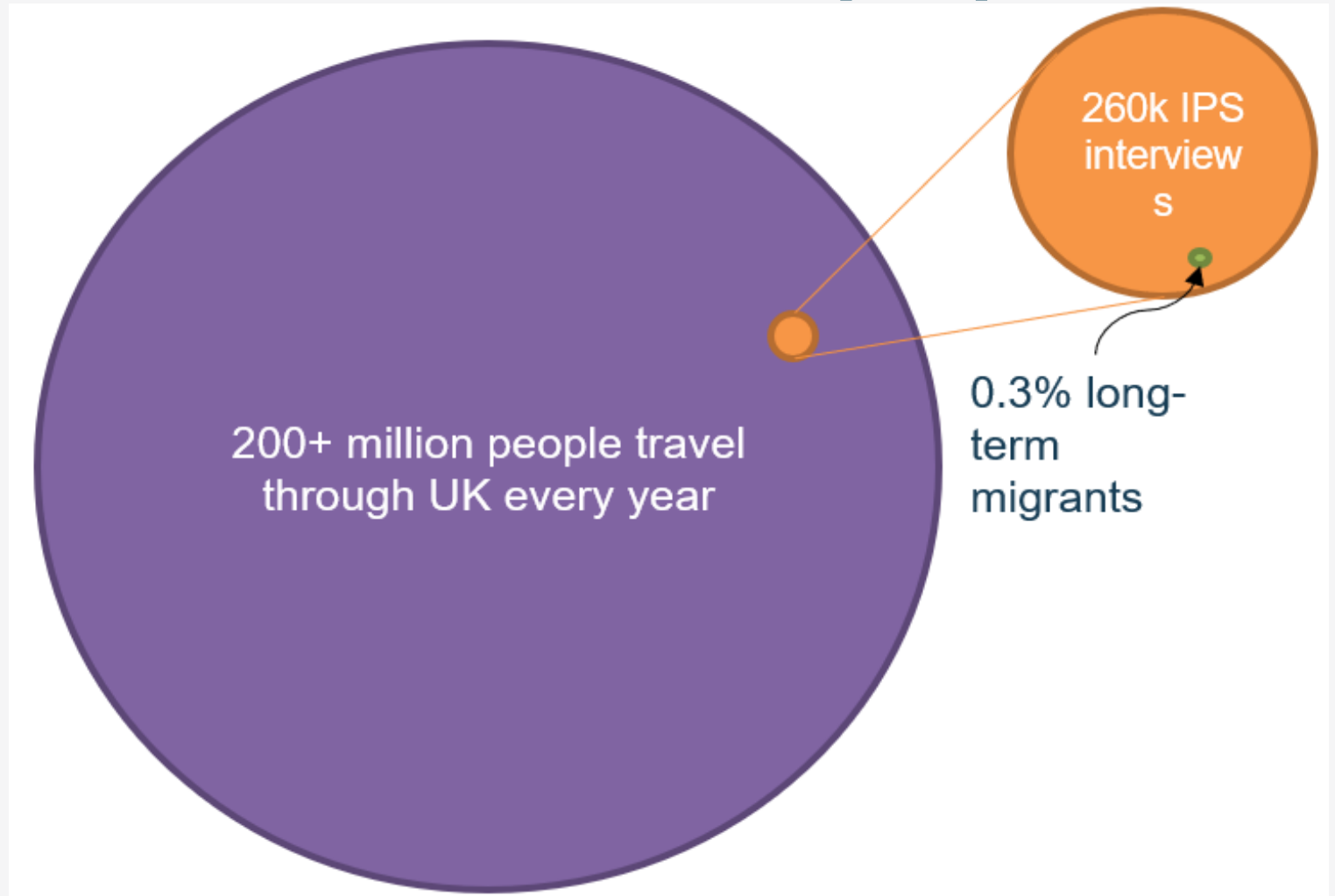
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Overview of International Migration

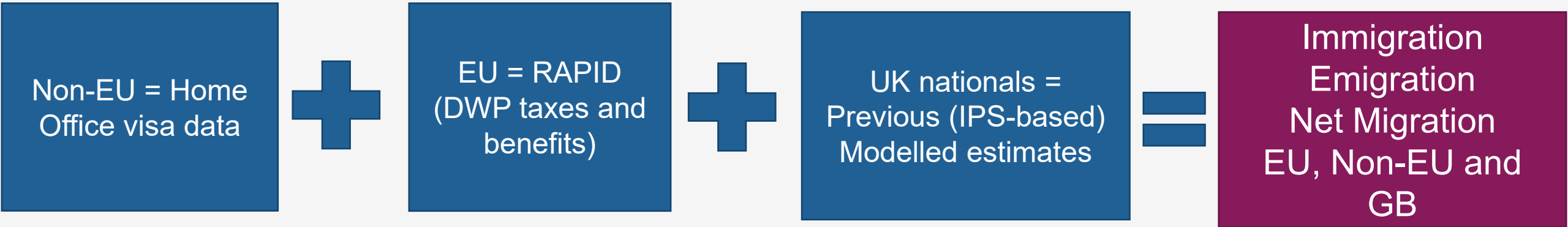


Historic migration statistics not fit for purpose

- International Passenger Survey, intentions based
- No net migration by reason (inc. students)
- Disaggregation difficult due to already wide confidence intervals



Delivering transformed migration statistics



Reflections

- Stove-pipe versus Matrix model
- Designing in resilience
- Socialising Bayesian methods- use of narrative and metaphor
- Segmentation of audiences
- Capability- building
- Making flexibility the new Business As Usual
- Cultural shift
- Active user engagement
- Challenge linear thinking

Questions and comments welcome!

