GLAINTELLIGENCE UNIT

Use of origin-destination census data to produce small area population projections for London

Ben Corr

Greater London Authority

- Introduction to GLA projections
- Overview of models
- Small area projection model
  - Operation
  - Data Sources
  - Example outputs
- Future work

Introduction to GLA projections

Recent work builds on a long history:

- Roots in the early 1970s at the Greater London Council
- Work continued at London Research Centre
- Function now sits within the GLA's Intelligence Unit

Current projection outputs

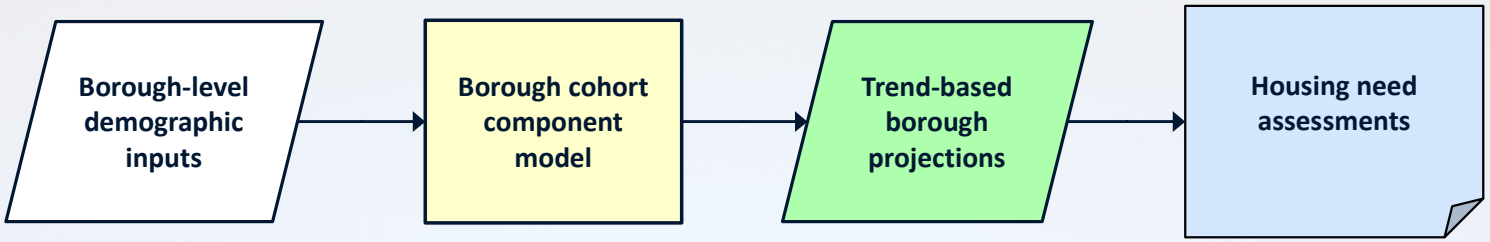
- LA population
  - Trend-based and housing-linked
- LA population by ethnic group
- LA households
- Ward population

Uses of GLA projections

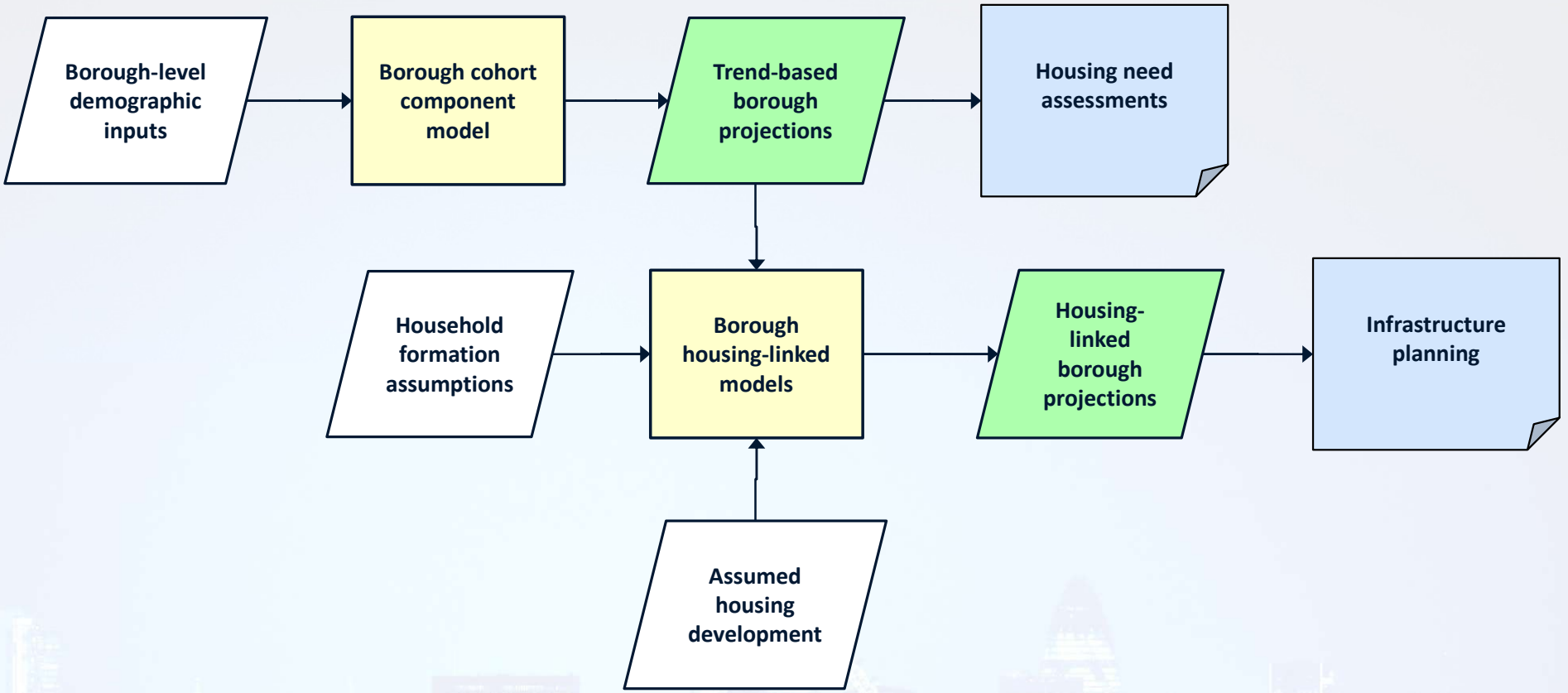
Outputs inform wide range of planning activities, including:

- The London Plan (regional spatial development strategy)
- London Strategic Housing Market Assessment
- Transport planning (inputs to TfL's models)
- London Infrastructure Plan
- Individual local plans
- School place planning

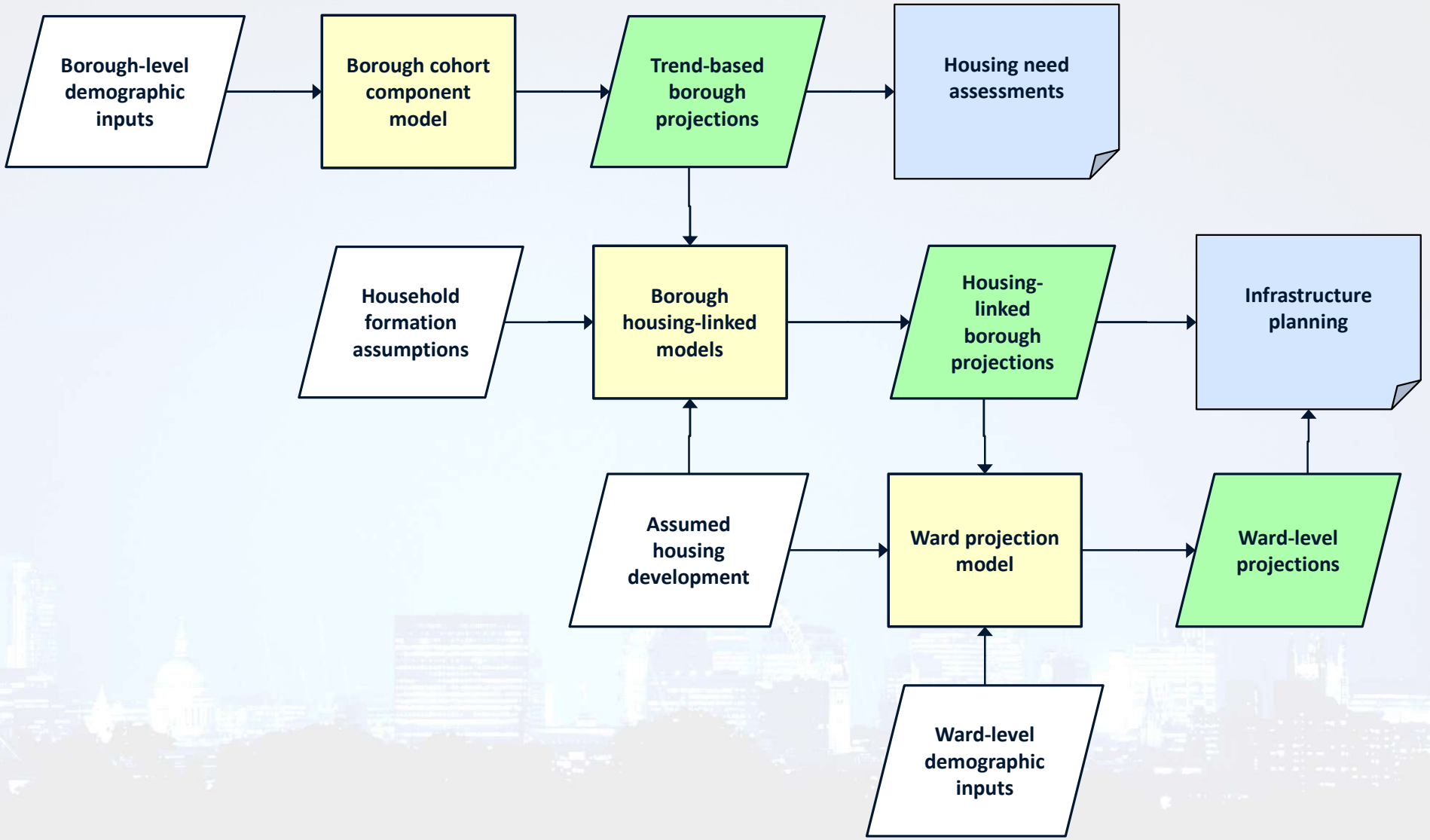
Overview of GLA population models



Overview of GLA population models



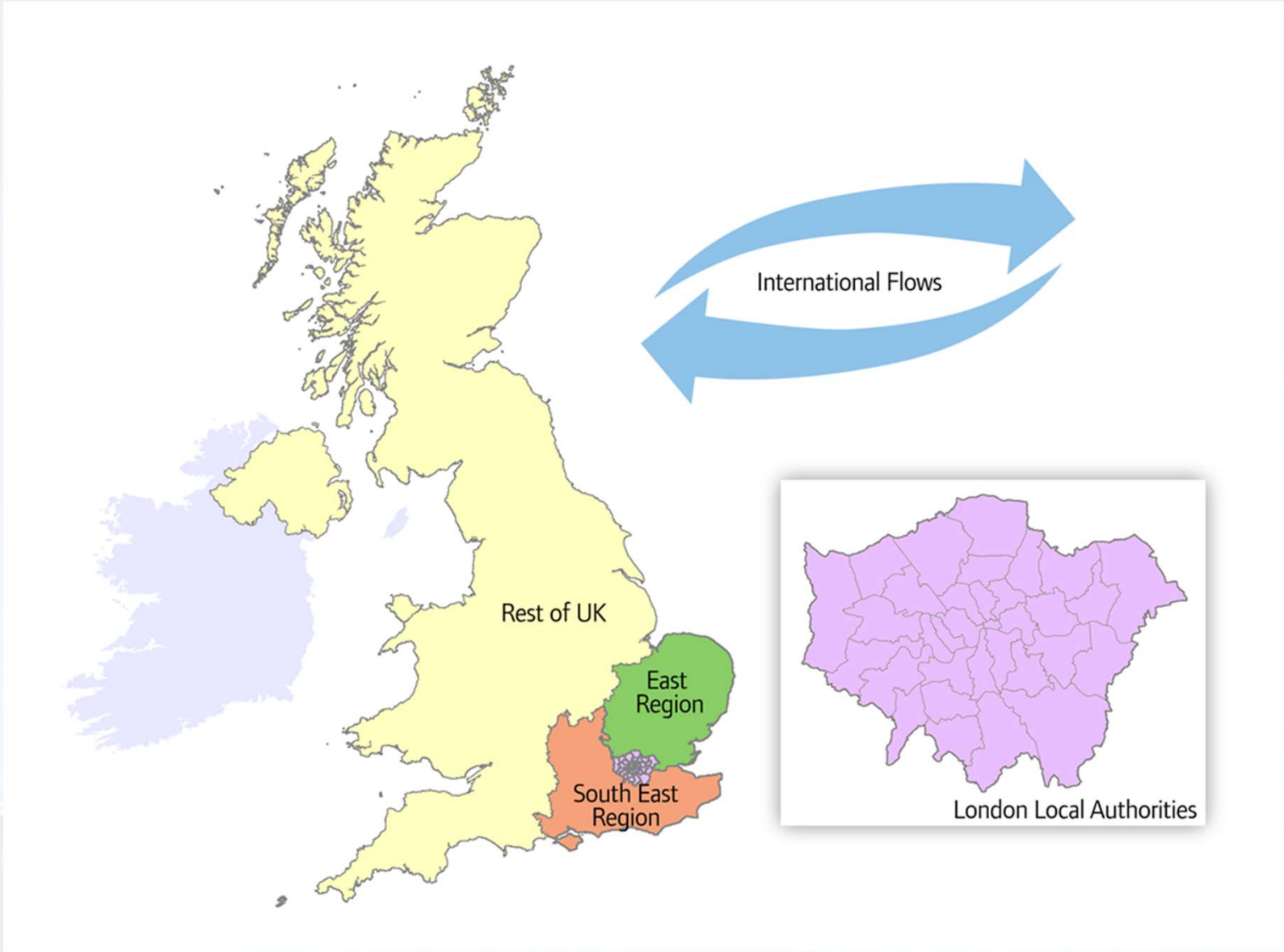
Overview of GLA population models



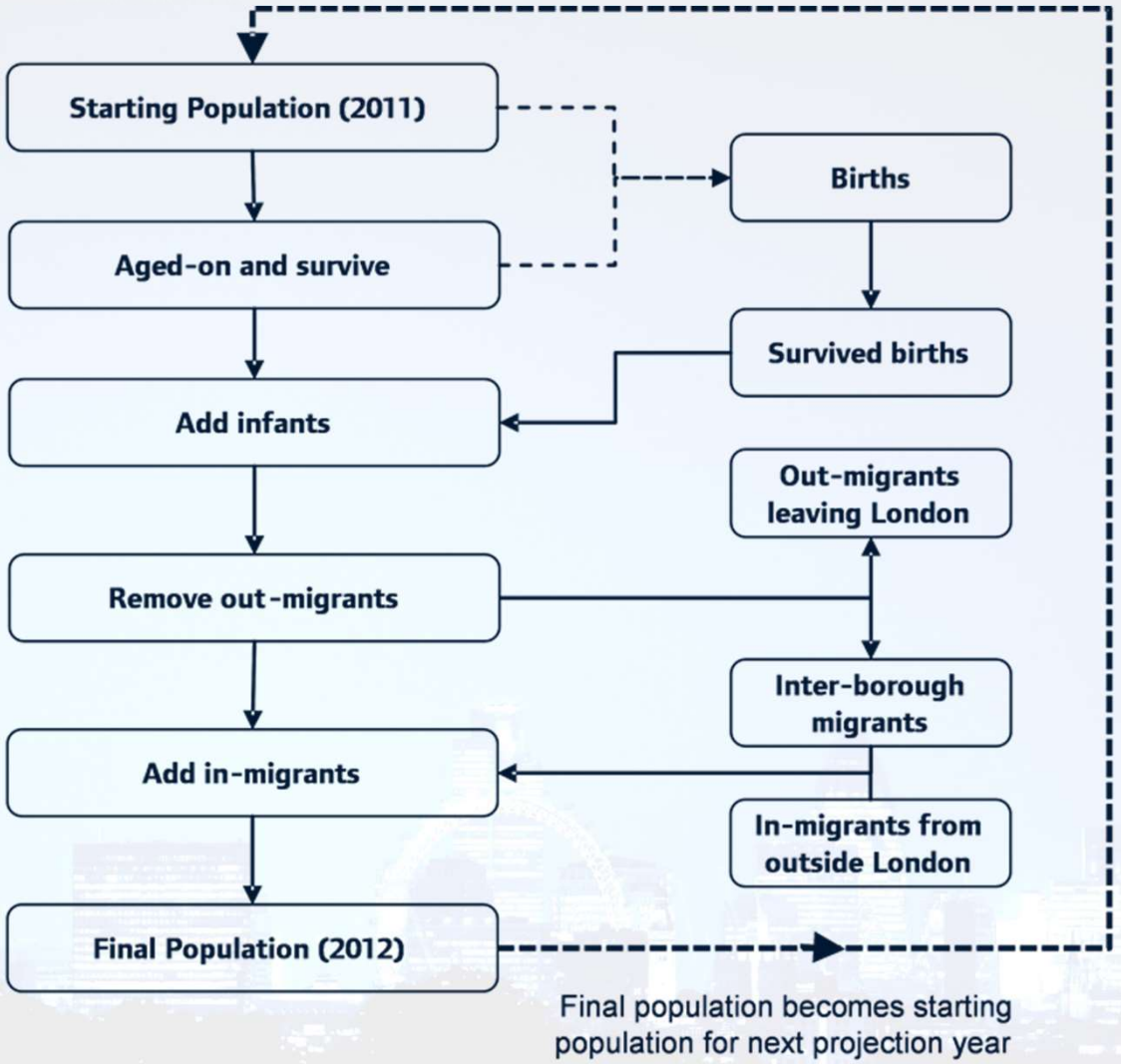
Borough cohort component model

- Multi-area model
- 33 London Authorities
- Projections for 3 UK regions exogenous to model
  - East, South East, and Rest of UK
  - ONS 2012-based SNPP
- Output population by SYA and sex to 2041

Model areas


International Flows
Rest of UK
East Region
South East Region
London Local Authorities

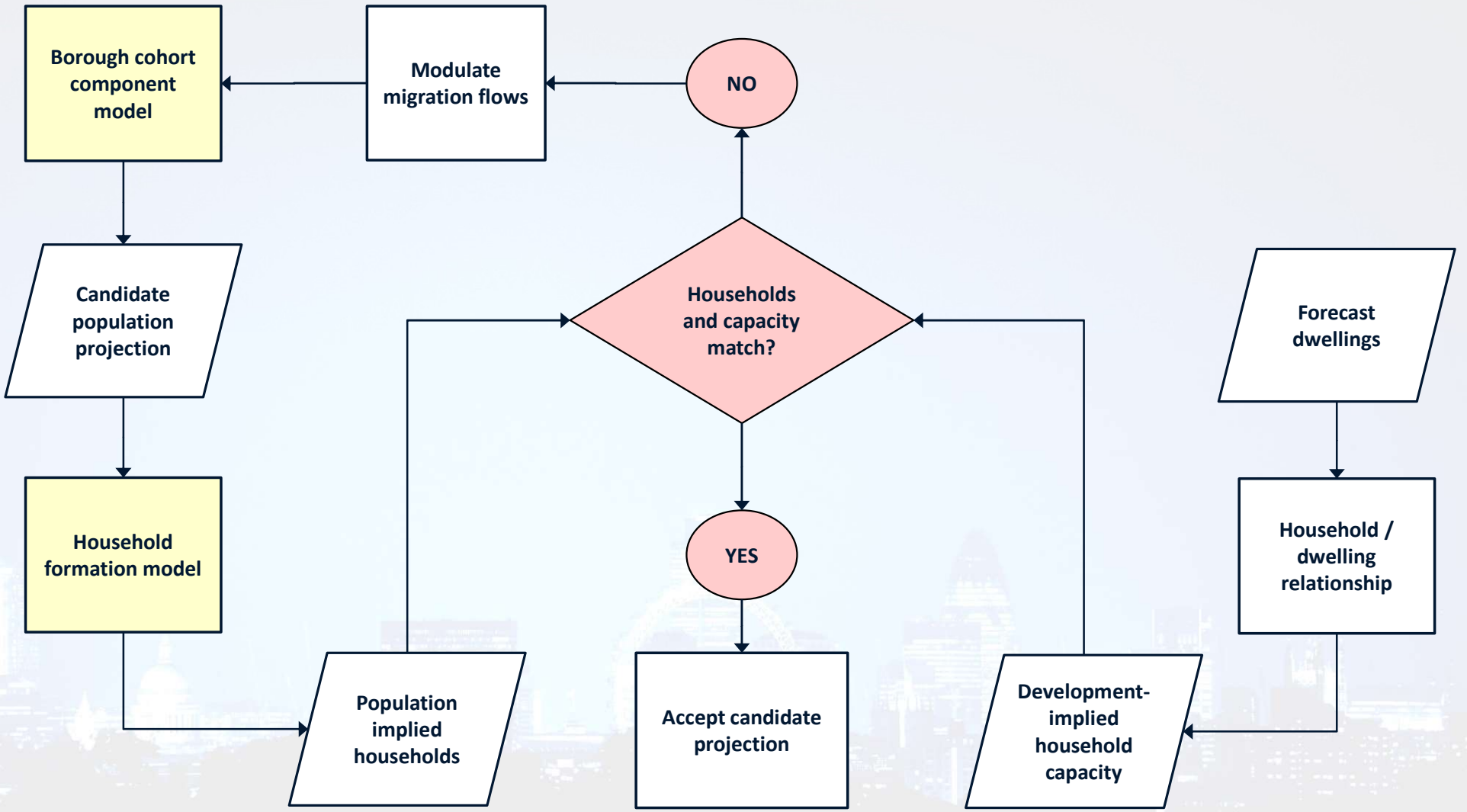
Borough cohort component model



Borough housing-linked models

- Generate candidate projection with cohort model
- Convert population to households
  - Apply Household Representative Rates from DCLG HH projections
- Compare number of households with development implied capacity
- Modulate migration flows
- Iterate until households and capacity match

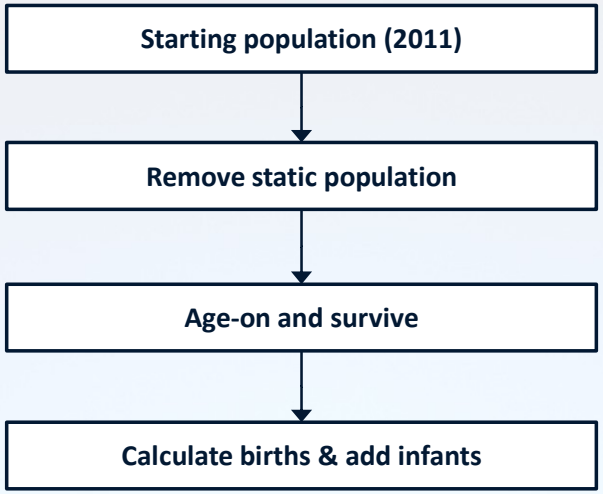
Borough housing-linked models



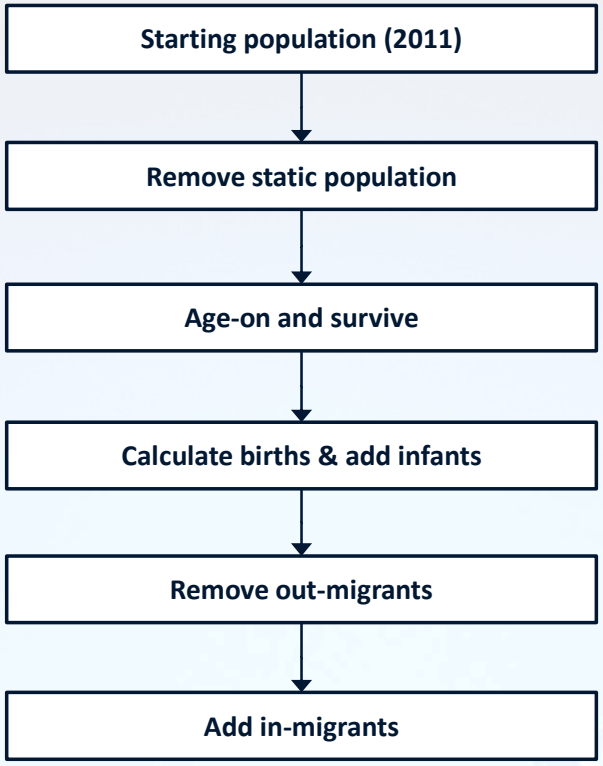
Ward projection model

- Cohort-component model
- Proxy migration flows linked to housing
- Outputs constrained to match borough projection

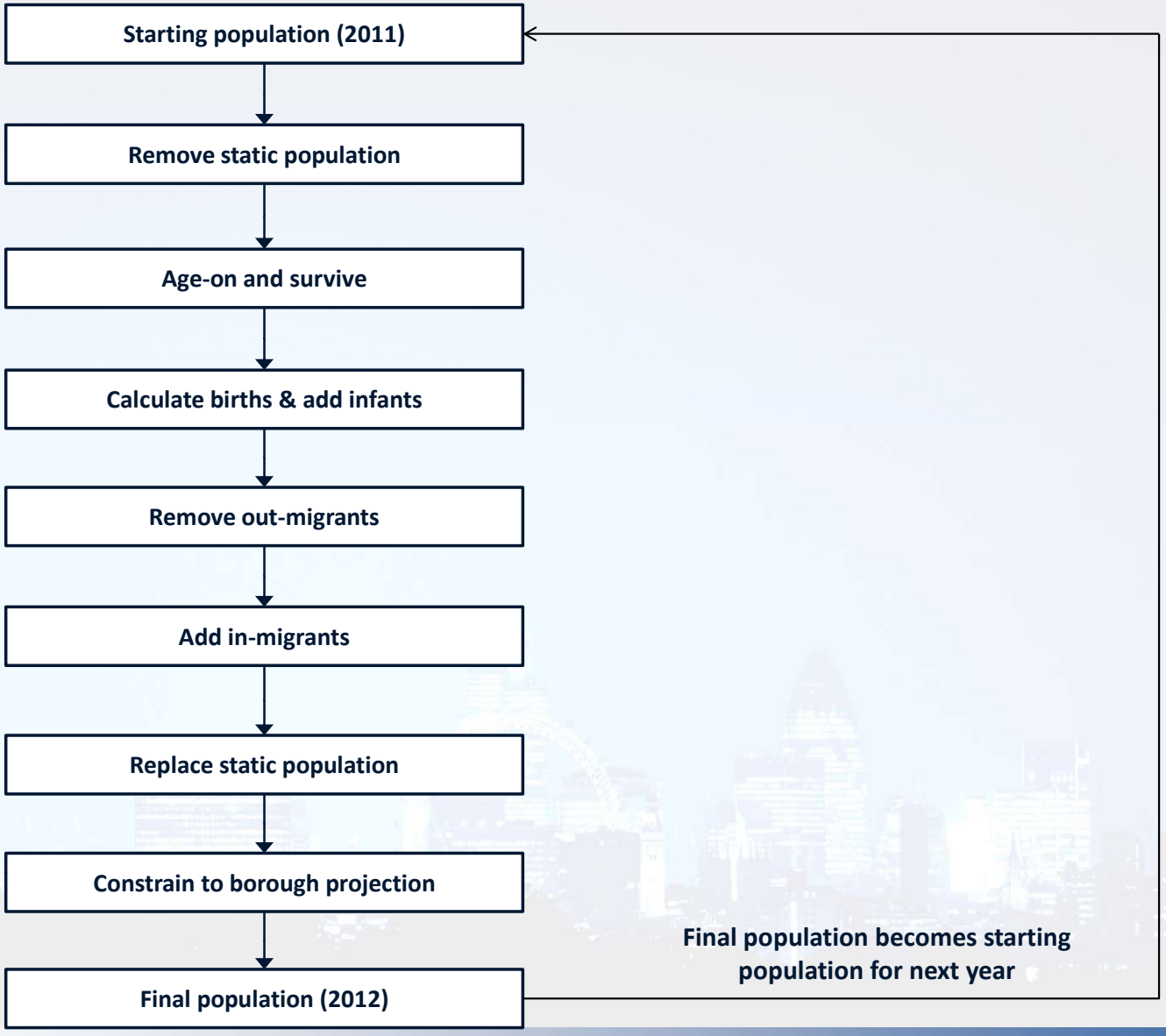
Ward projection model



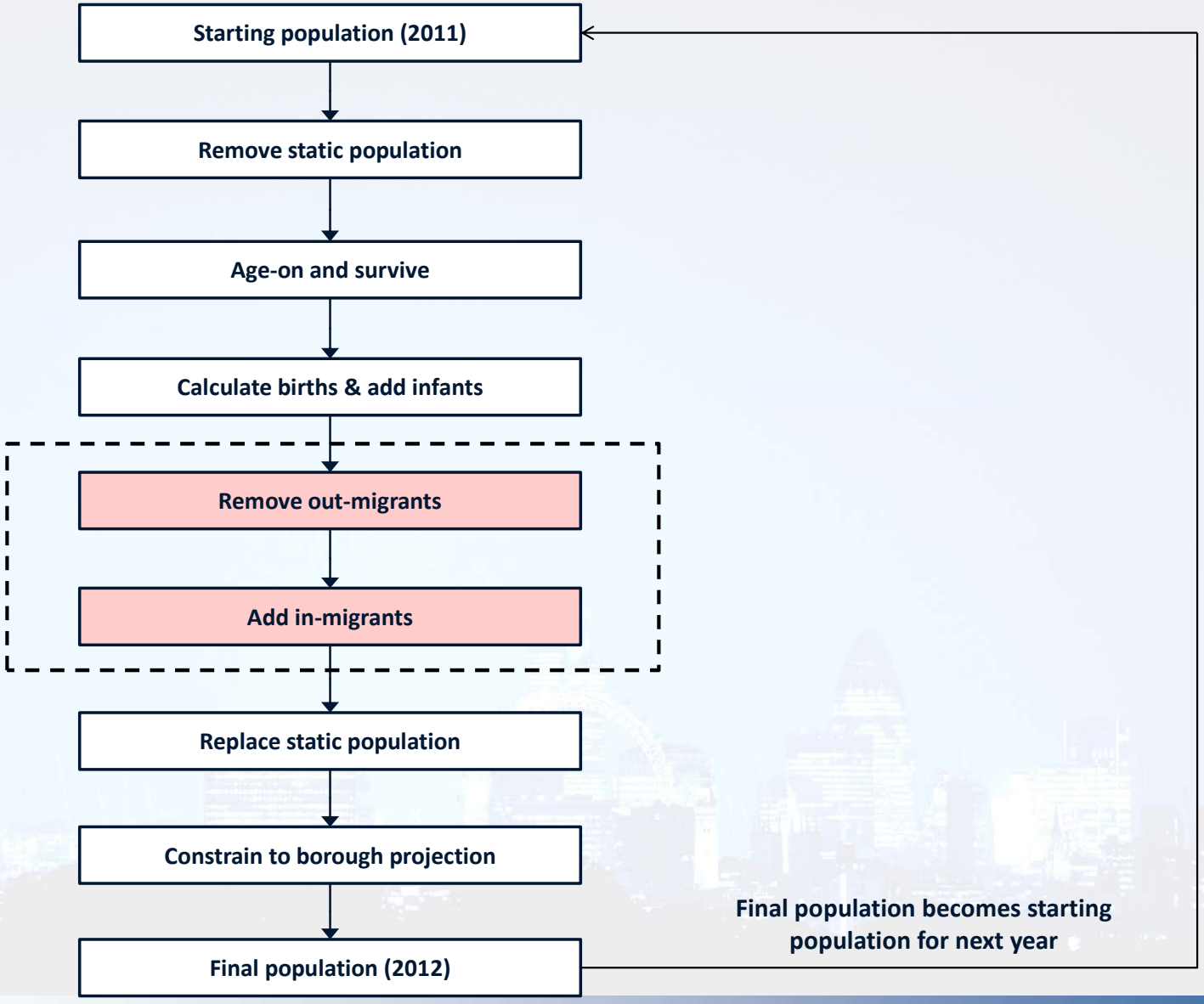
Ward projection model



Ward projection model



Ward projection model

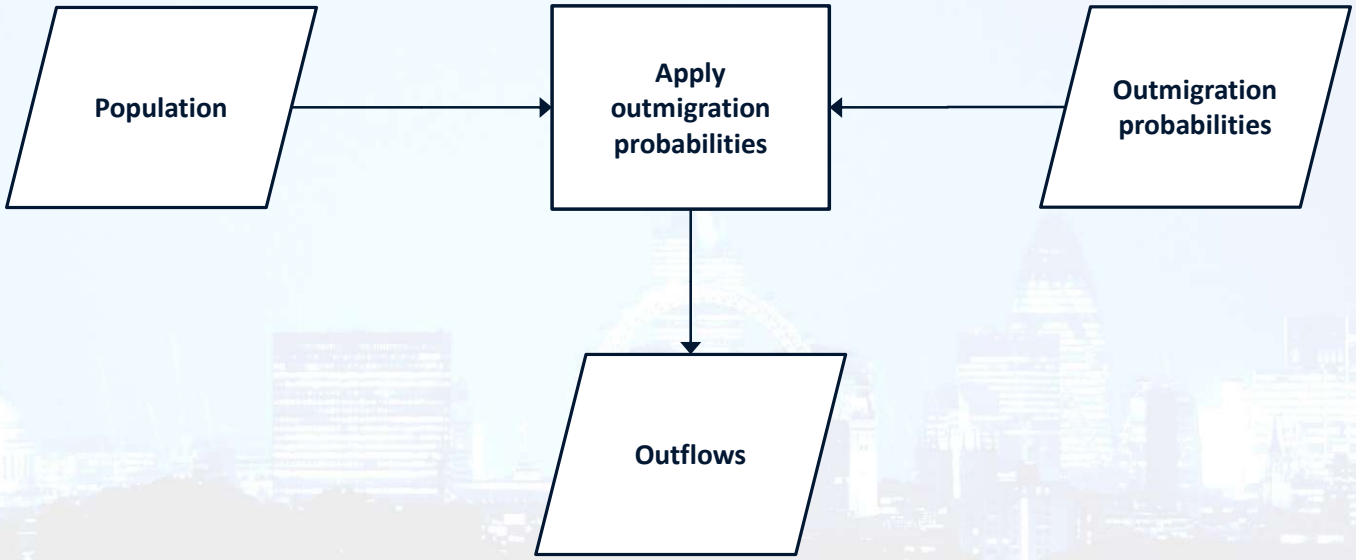


Migration data

- Annual migration data not published below LA level
- Rely on census data combined with other sources to build proxies
- Limits to what origin-destination tables can be commissioned from census

Outflows

- Outflows calculated by applying set of probabilities to population
- Probabilities fixed



Creating outflow probabilities

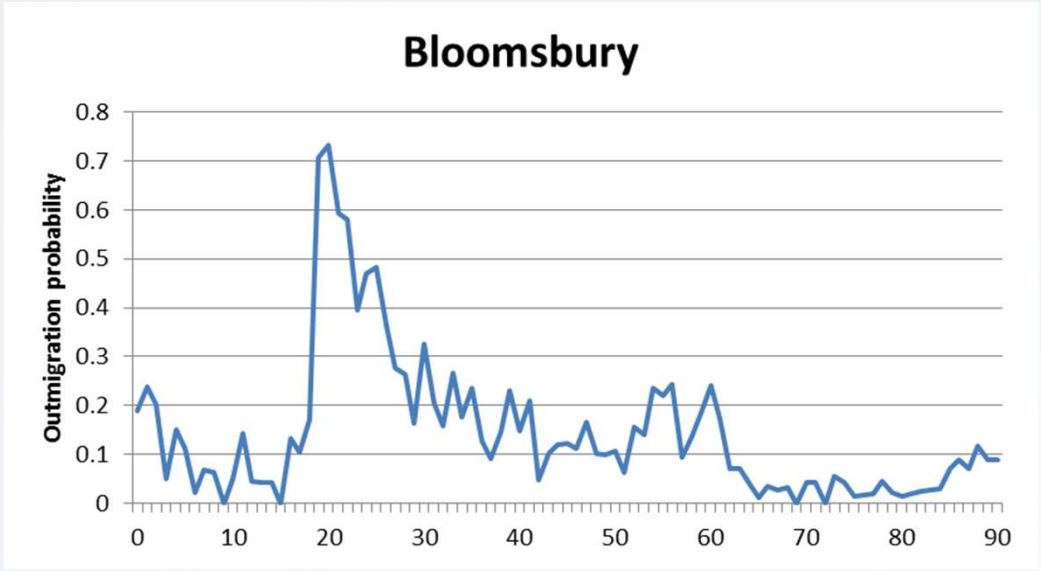
- Census gives flows from ward to any other UK destination
  - Commissioned table CT0356
- Local authority international outflow estimates available from ONS MYE
  - Disaggregation to wards based on number foreign born
- Denominators use estimates of 2010 population
  - back-cast from census population

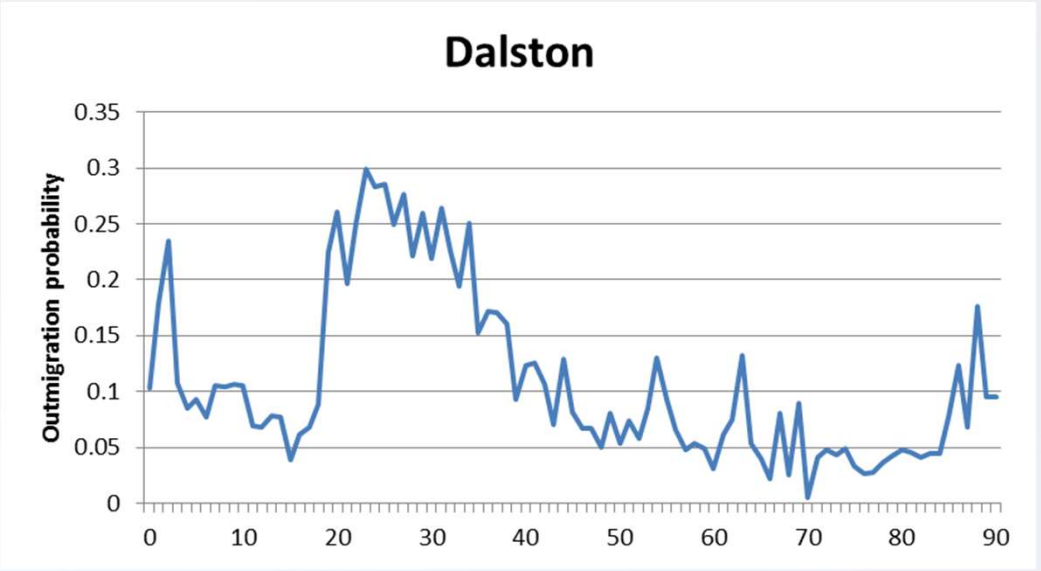
Determining inflows

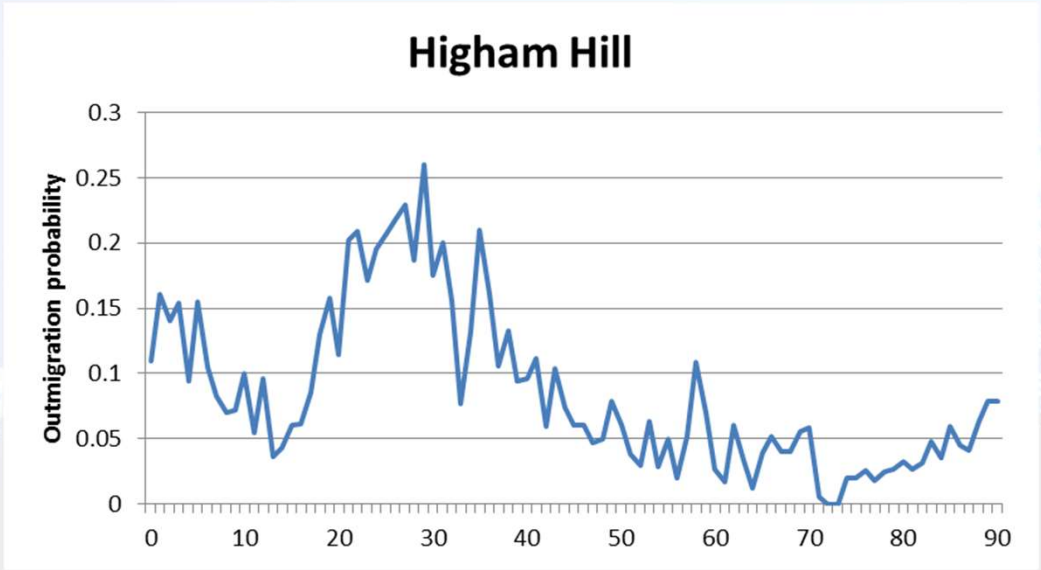
- Census gives age and sex characteristics of inflows
  - Commissioned table CT0409
  - All inflows to ward from UK and overseas
- Model adjusts total inflow to meet a target number of adults
- Target based on:
  - Forecast number of dwellings
  - Census relationship between number of dwellings and number of adults

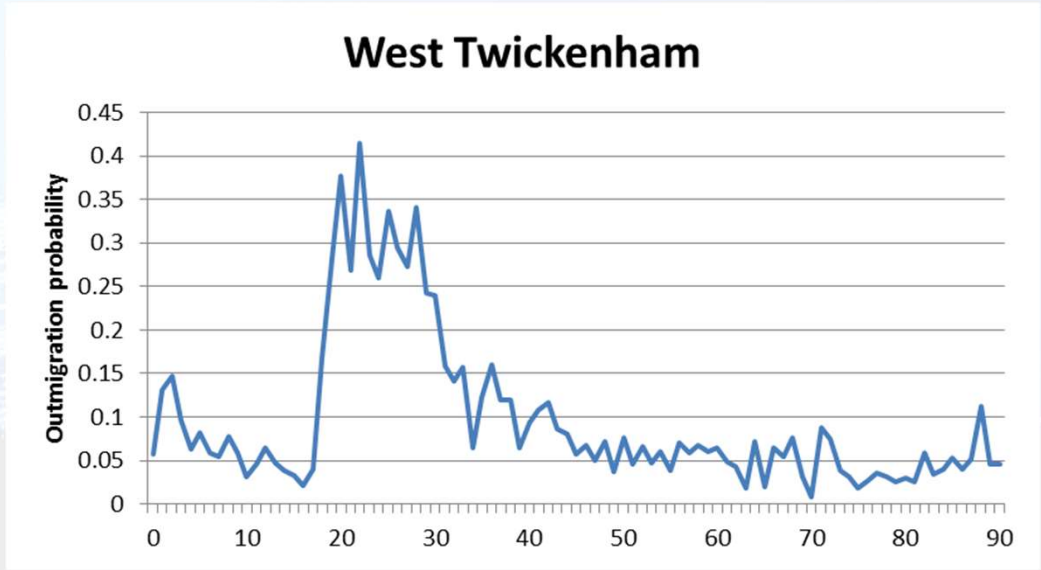
Determining inflows

Example outflow probabilities

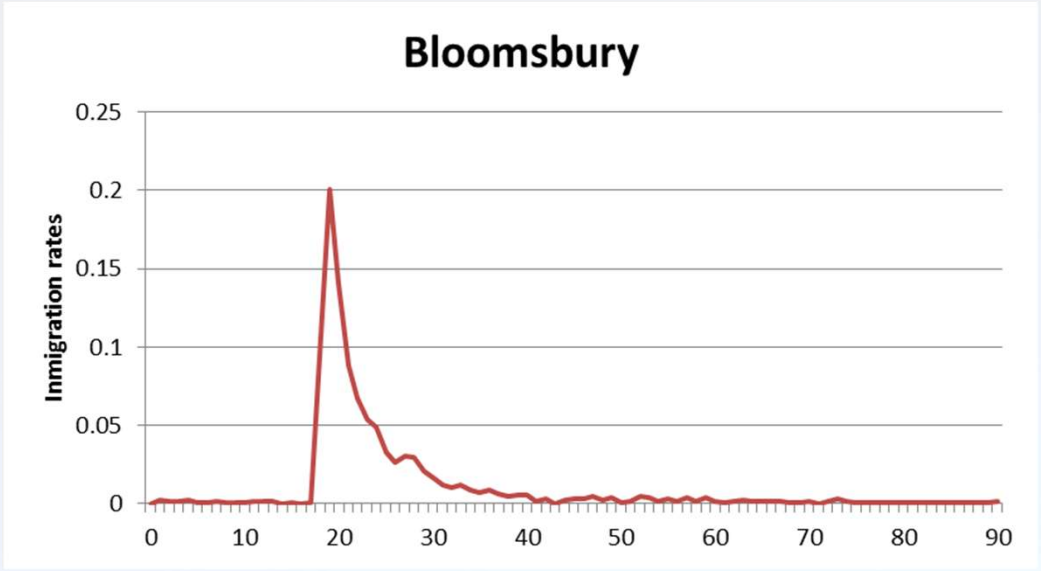


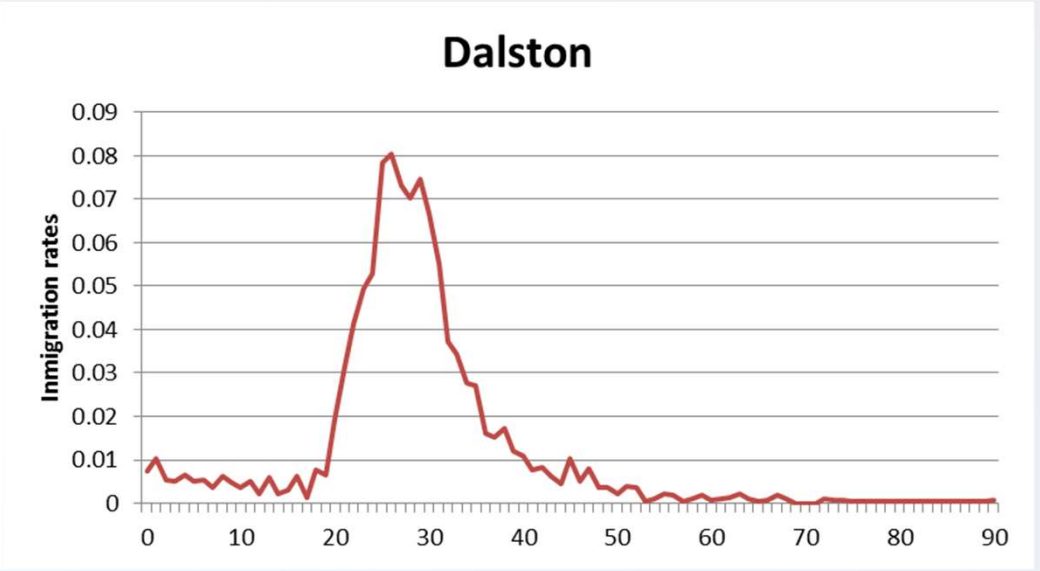


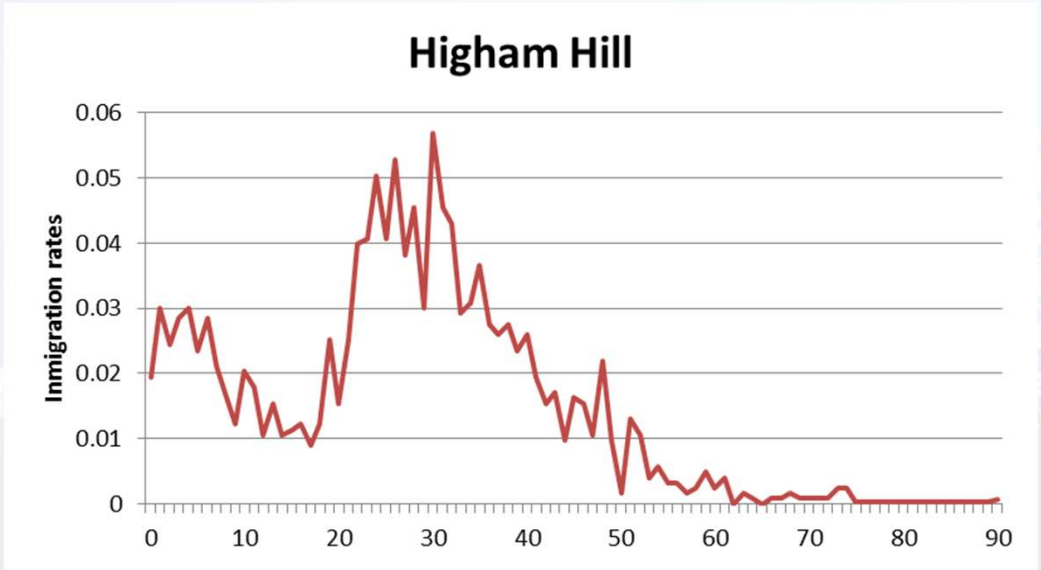


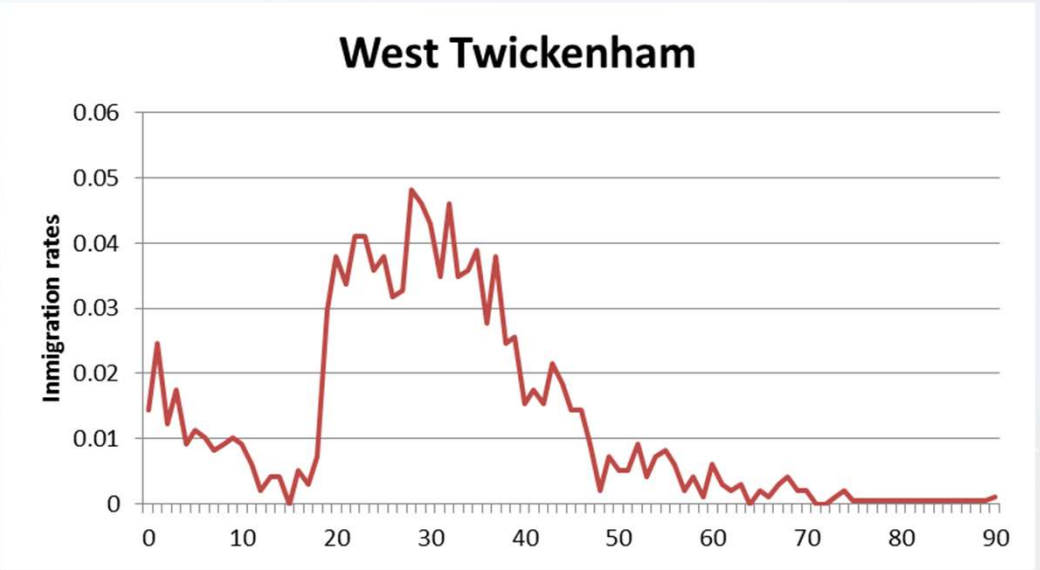


Example inflow characteristics









Some model limitations

- Reliant on census data for migration characteristics
- Until last year were still using 2001 data
- 2011 Census data captured during recession
  - Large impact on domestic migration flows
- For areas with very large scale development, characteristics of ward could change completely

Some model limitations

- Power of using number of dwellings to predict population variable across wards
  - New Central London developments can have low occupancy rates of usual residents
  - Outer London boroughs have seen large population growth with little new housing
- Model effectively assumes all new development has 'average' characteristics of the ward/borough
  - New build in some areas predominantly small flats

Quality assurance

- Checking multiple projections for >600 wards is a big job
- London wards cover an extremely diverse range of characteristics
- Rely on feedback from local authority colleagues to help sense-check results
- Make use of visualisation tools to help process

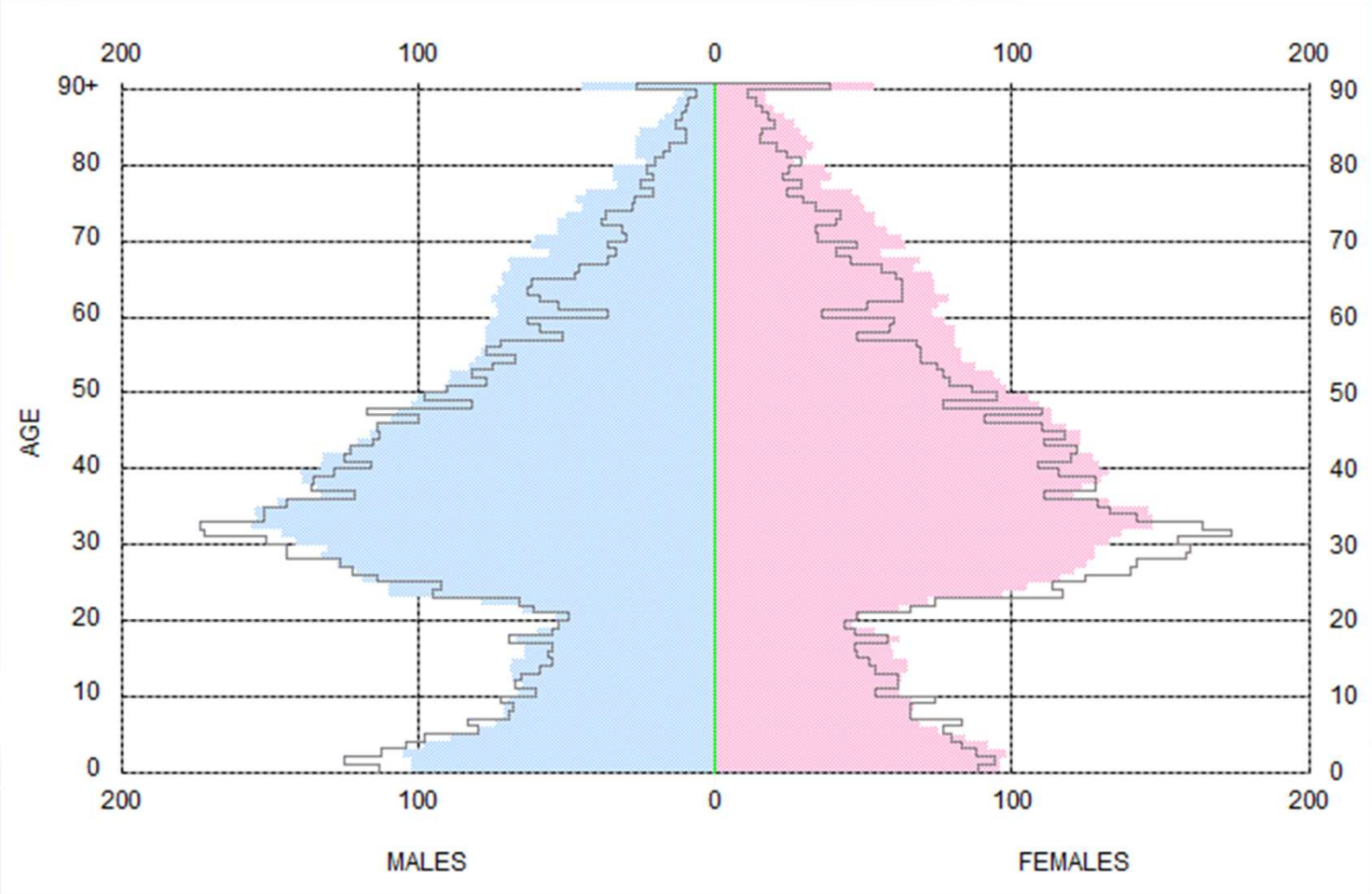
Highlighted model results

Examples to illustrate:

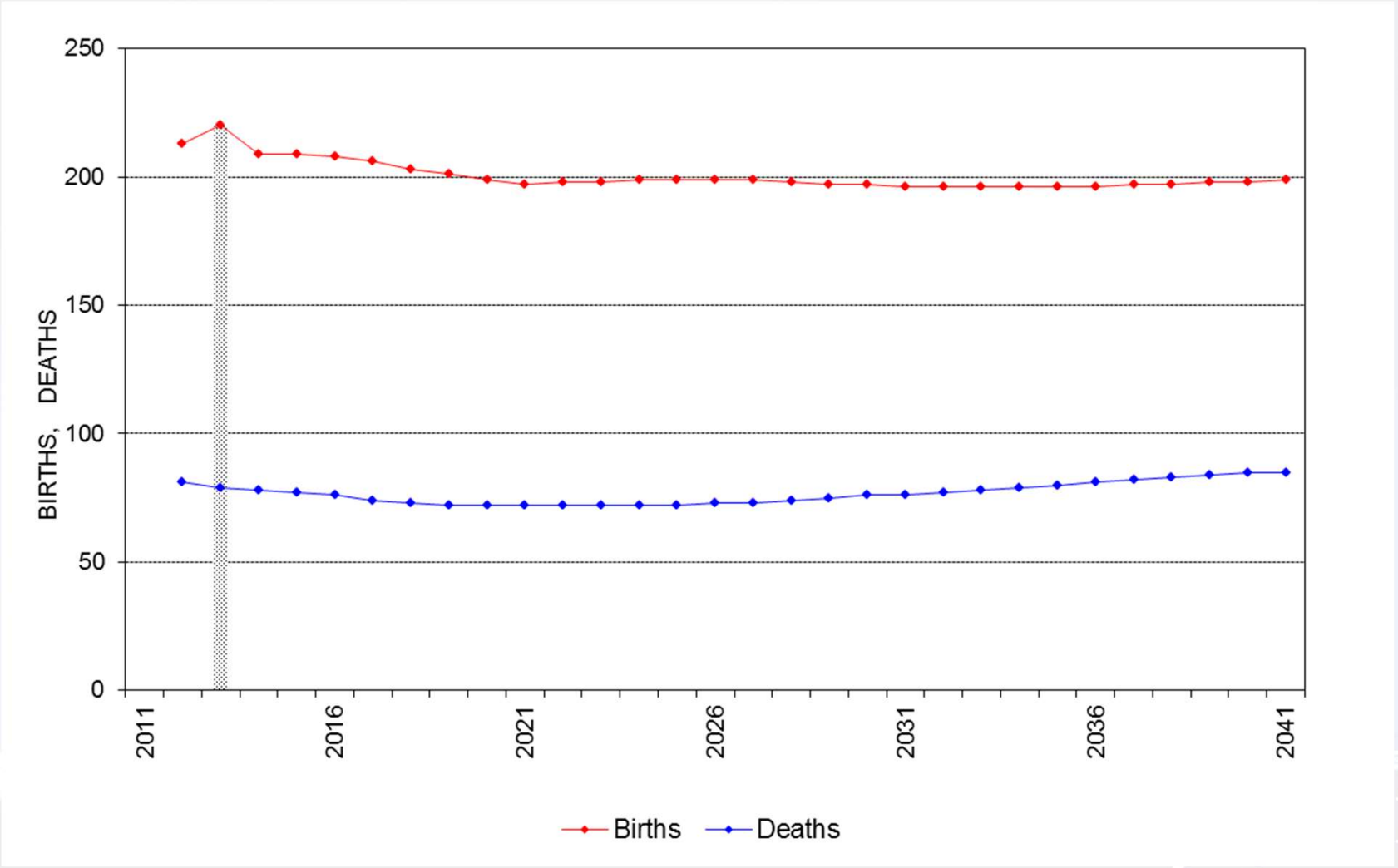
- A ‘typical’ ward
- Student areas
- Falling numbers of young adults in suburbia
- Impact of large scale development
- Gender biases
- Large communal establishment populations

Example results: 2011 & 2031 Walpole

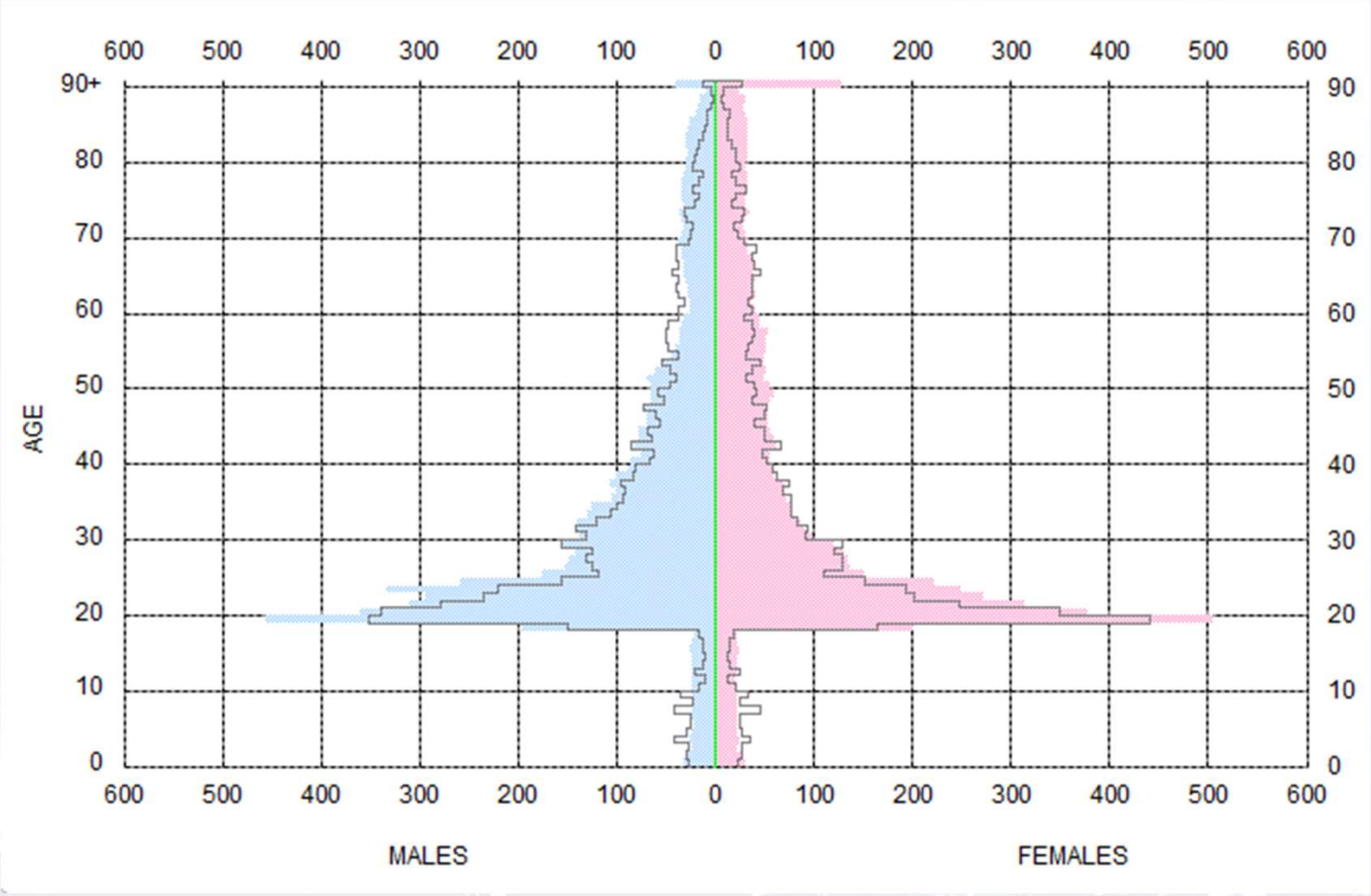
- Limited new development (600 units)
- Stable demographic



Example results: births and deaths Walpole

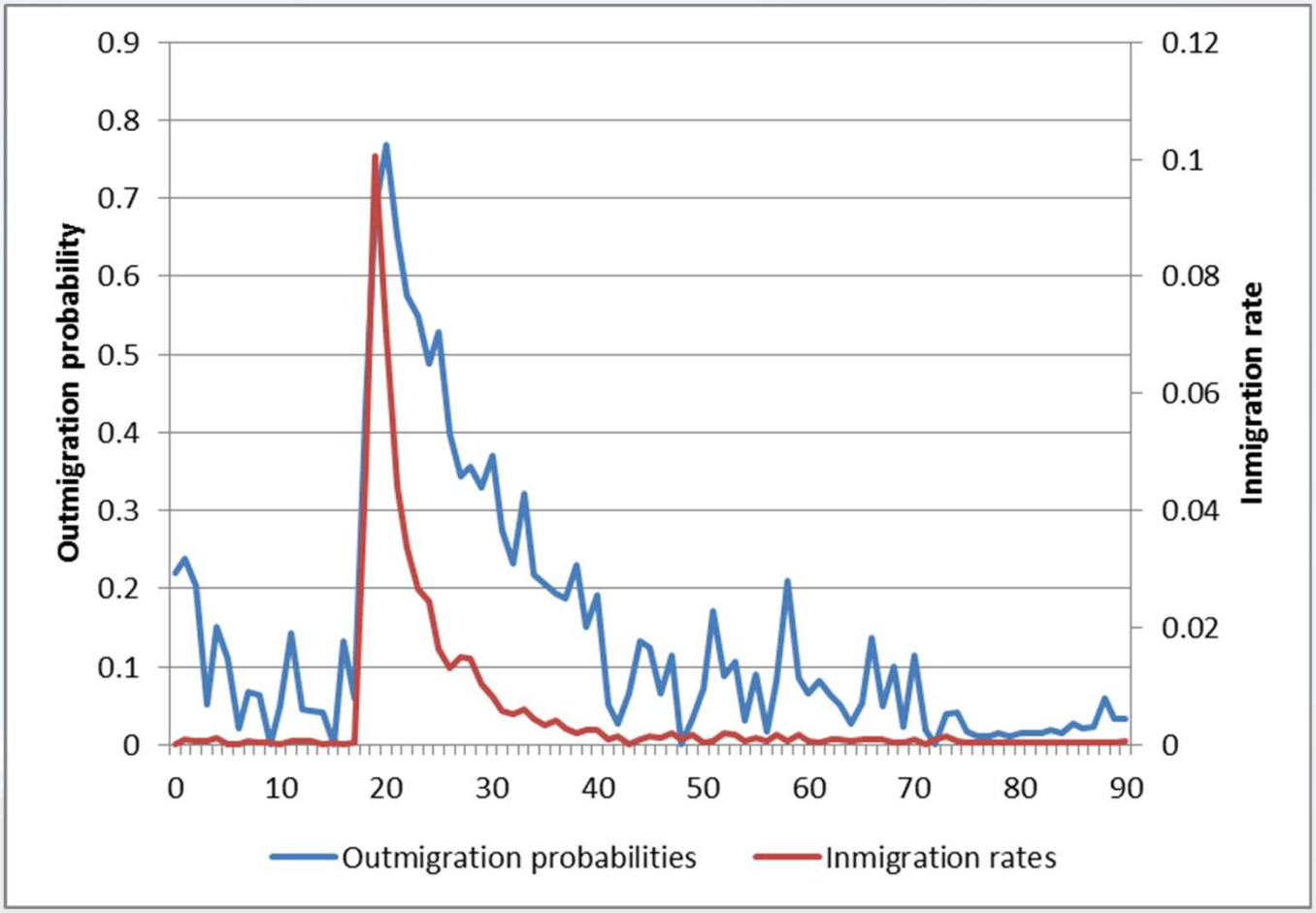


Example results: 2011 & 2031
Student areas (Bloomsbury)



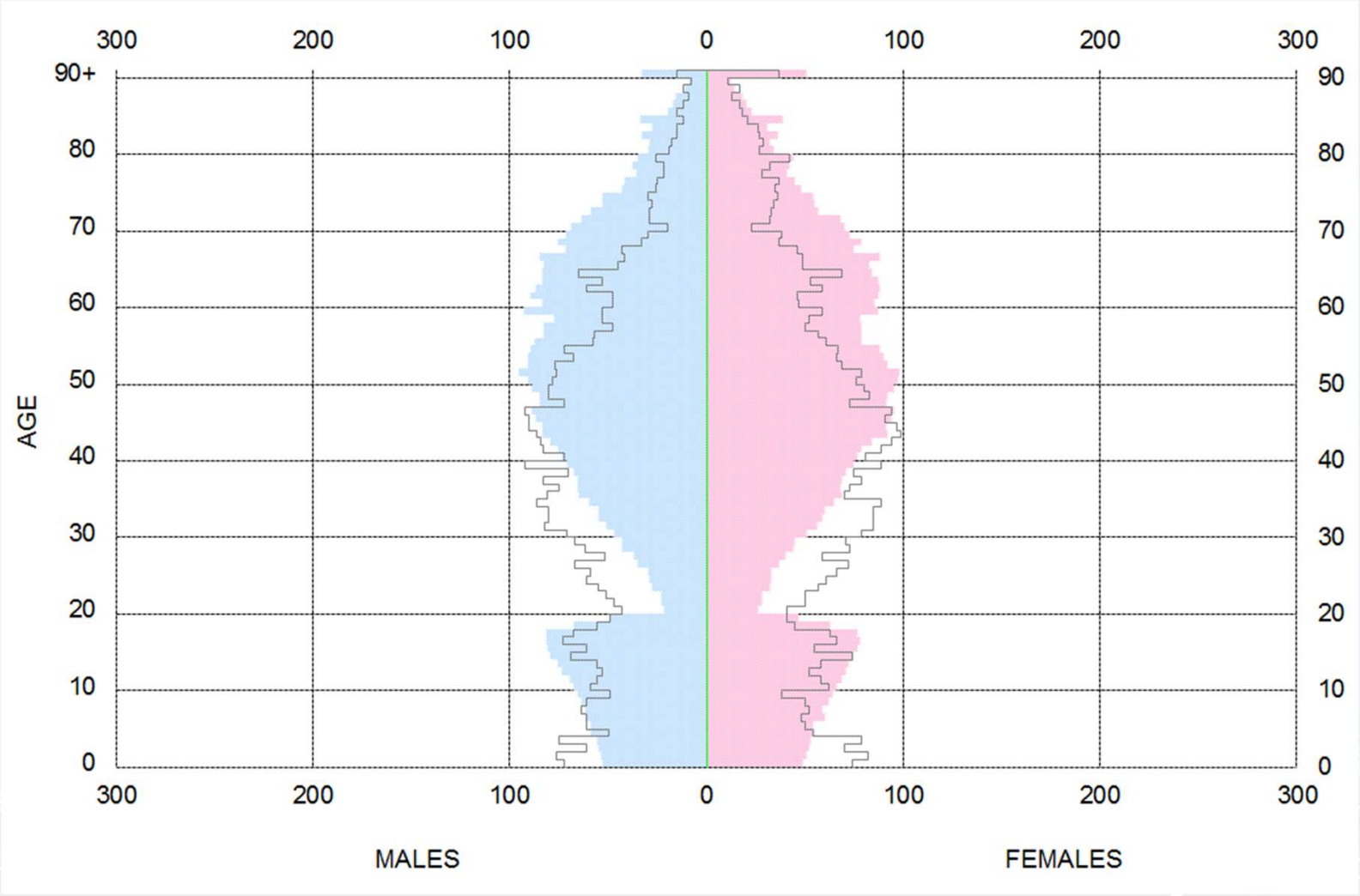
Migration inputs: Bloomsbury

- Sharp inflow peak at age 19
- Outflow peak at age 20

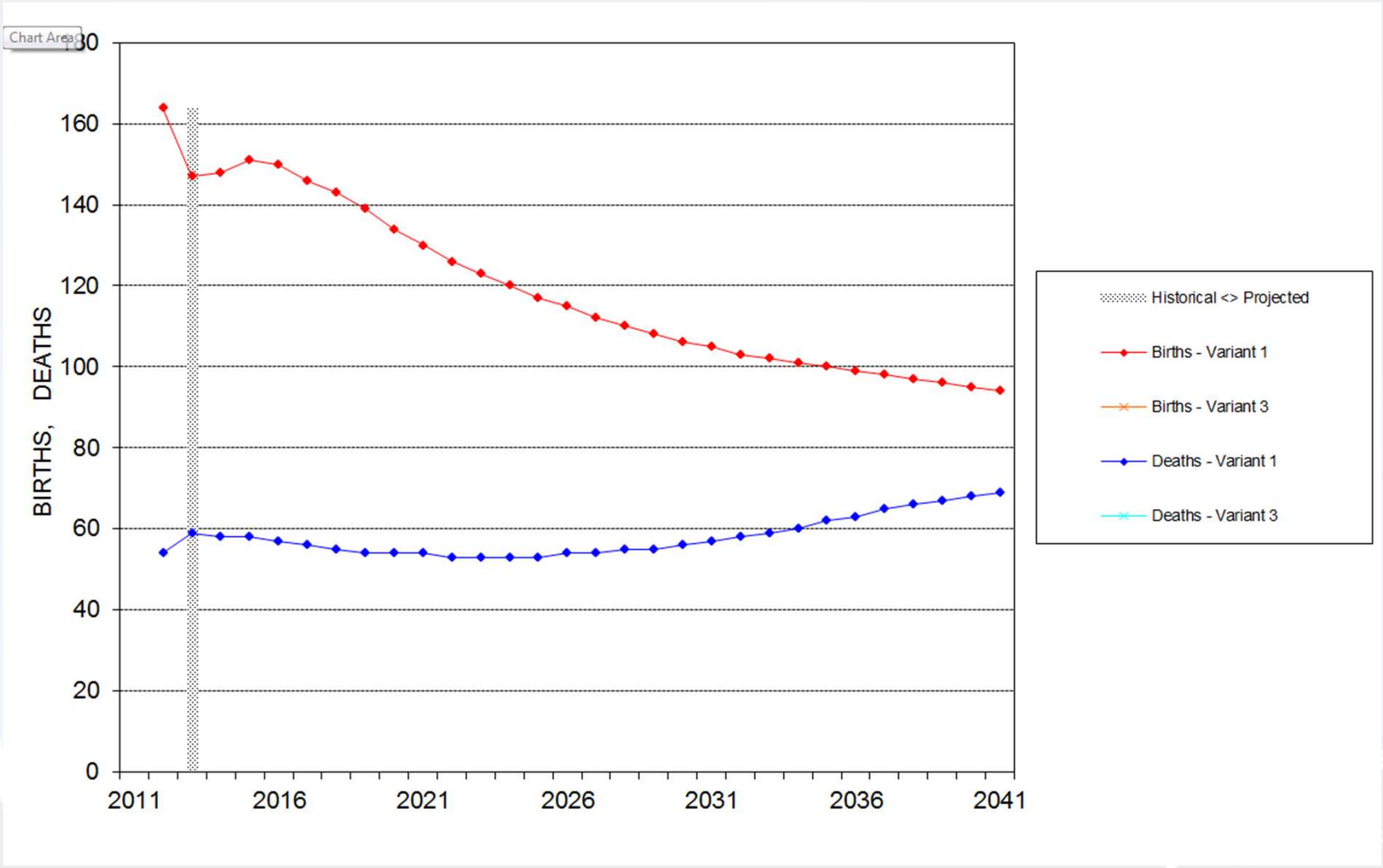


Example results: 2011 & 2031

Falling young adults (Carshalton Central)

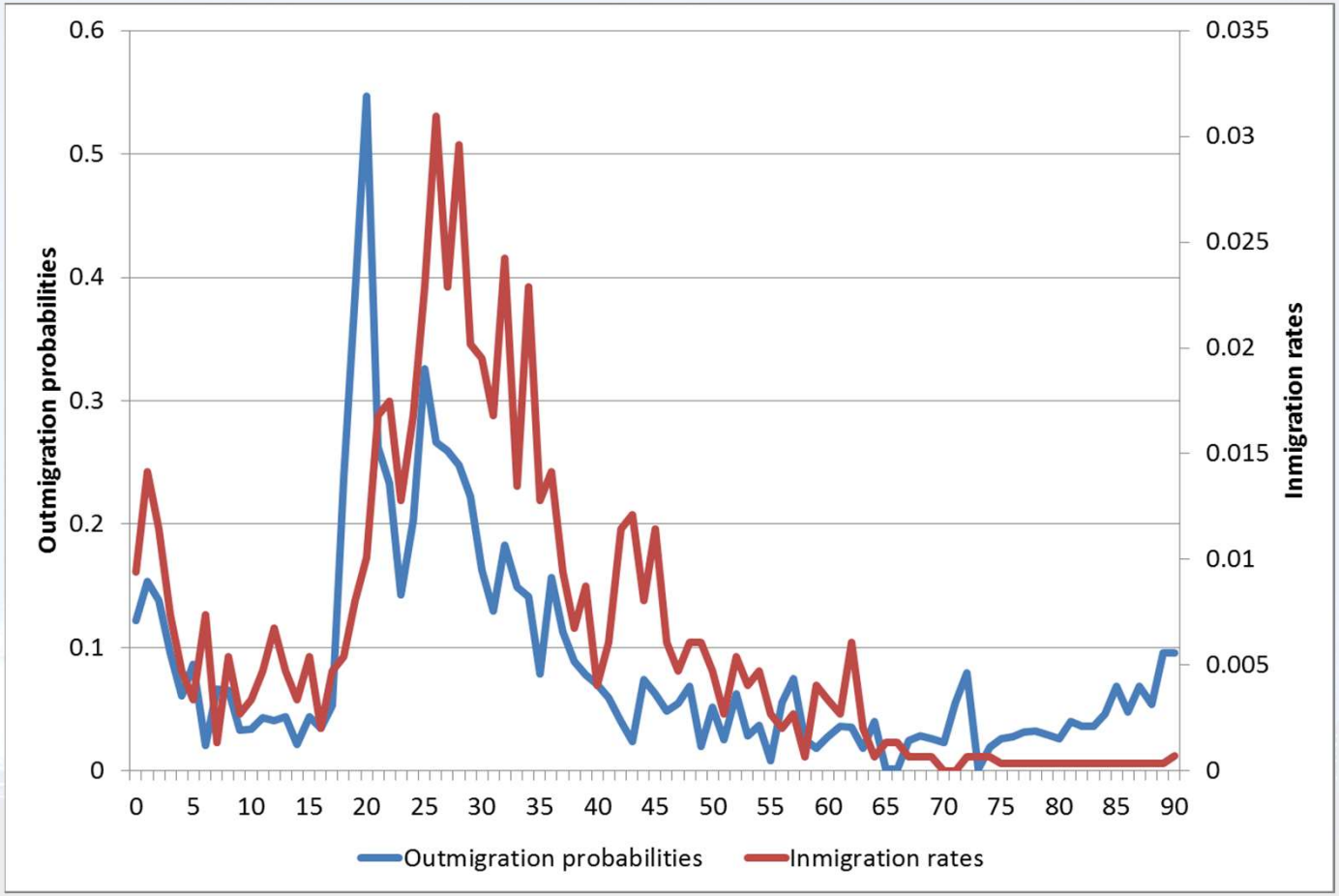


Example results: births and deaths Carshalton Central



Migration inputs: Carshalton Central

- High outmigration of students
- Low in-migration rates until late 20s

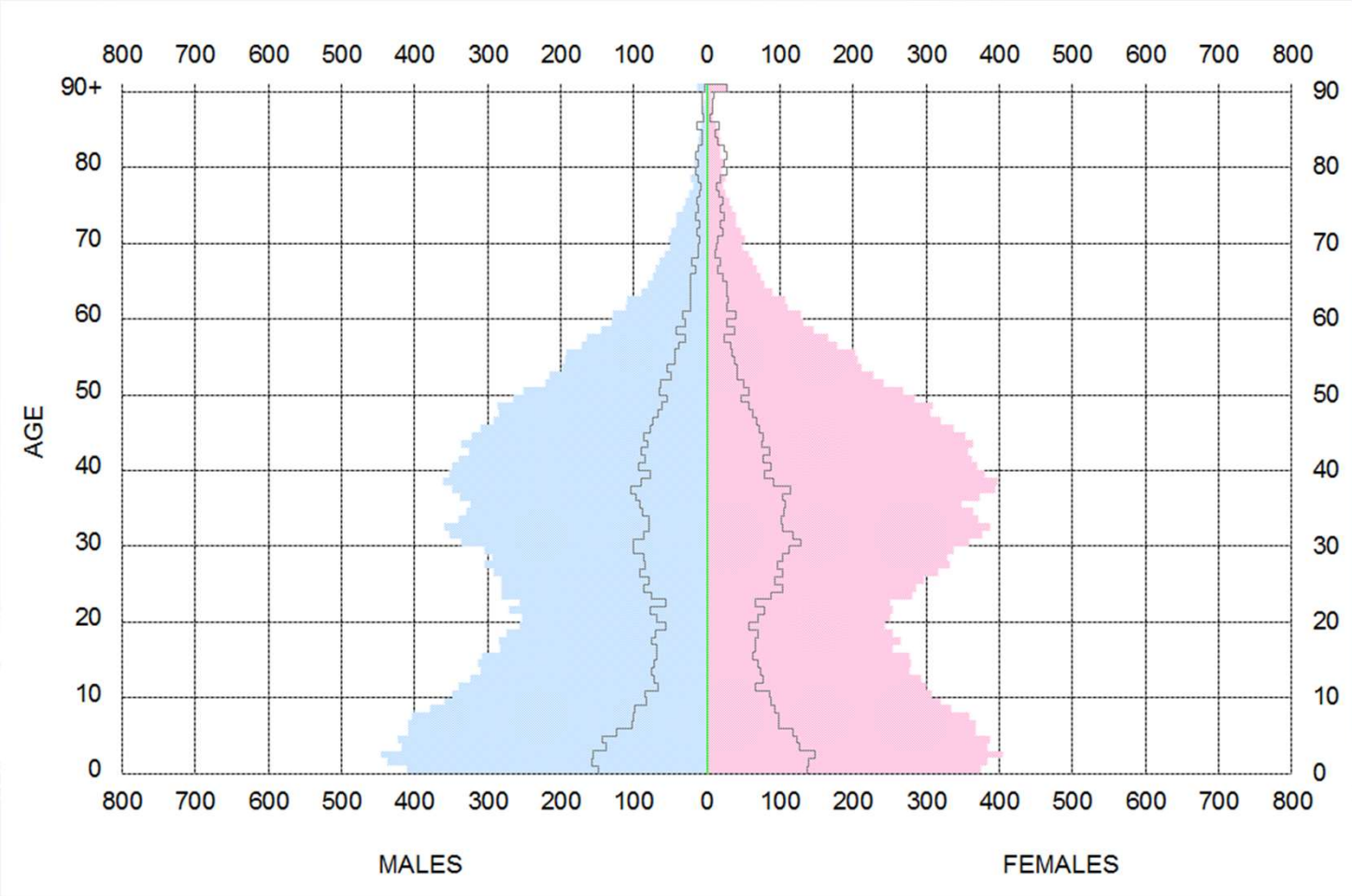


Example results: 2011 & 2031

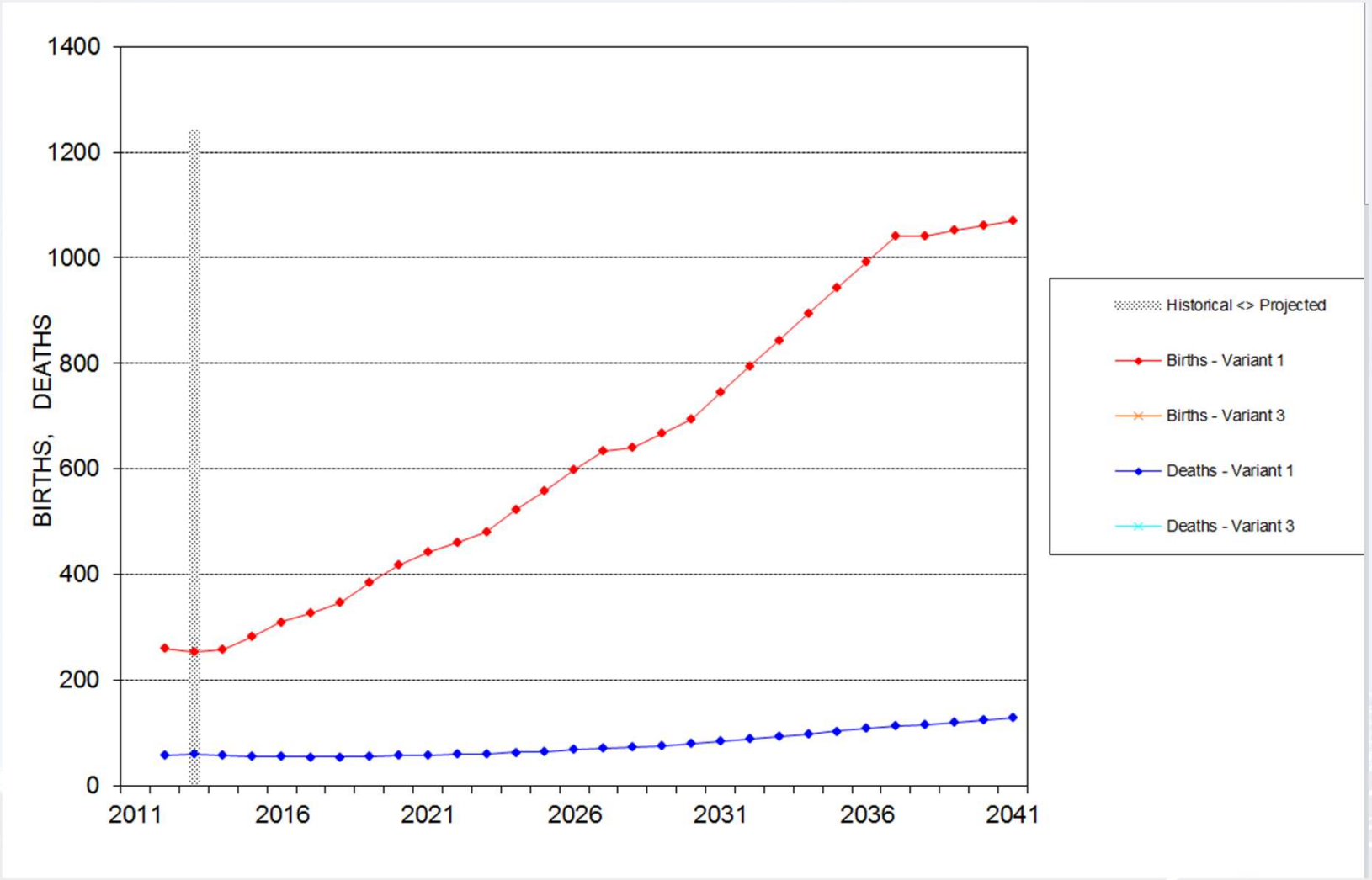
Large scale development (Thames)

2011: 4,000 dwellings; 11,000 residents

2031: 13,000 dwellings; 35,000 residents



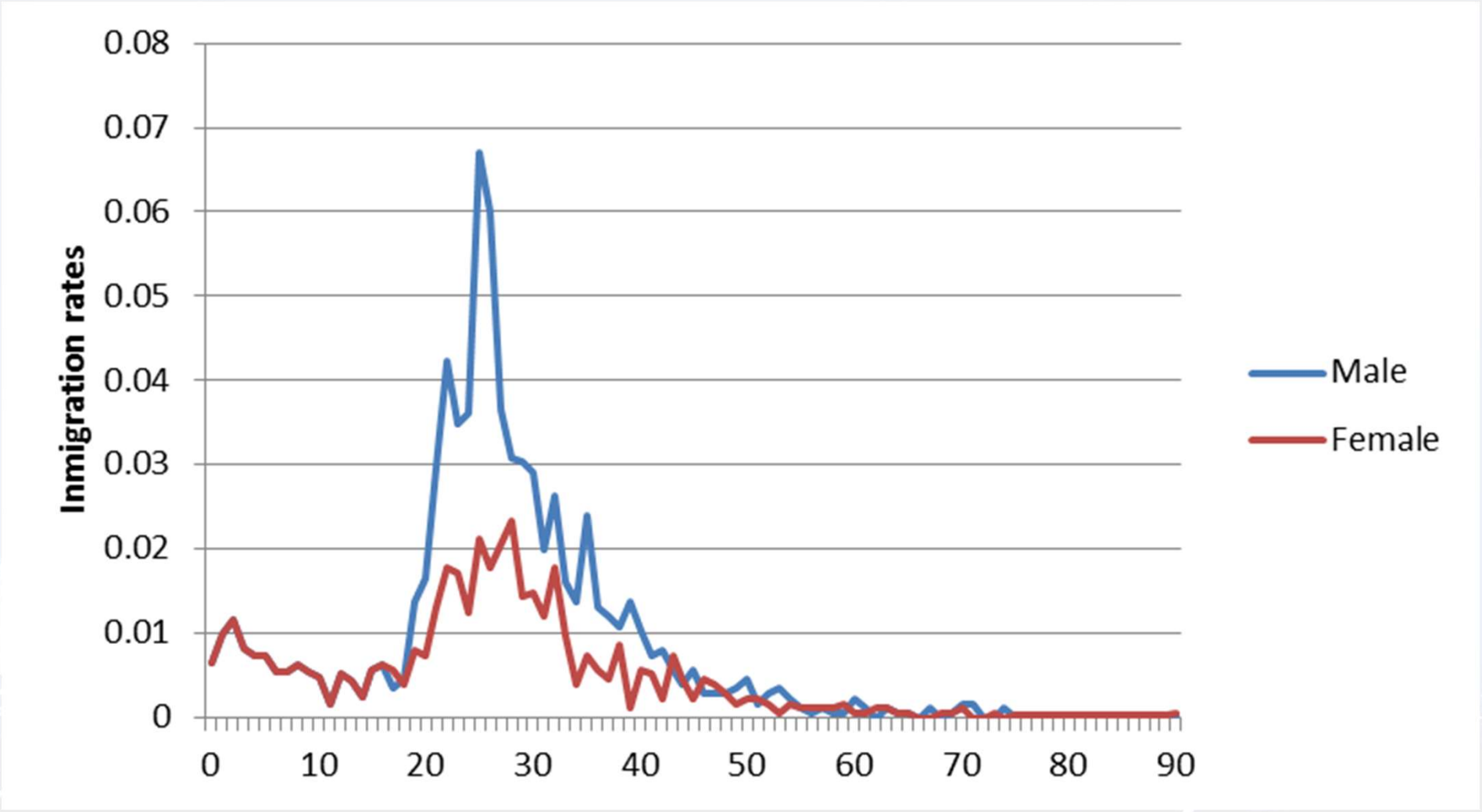
Example results: births and deaths Thames



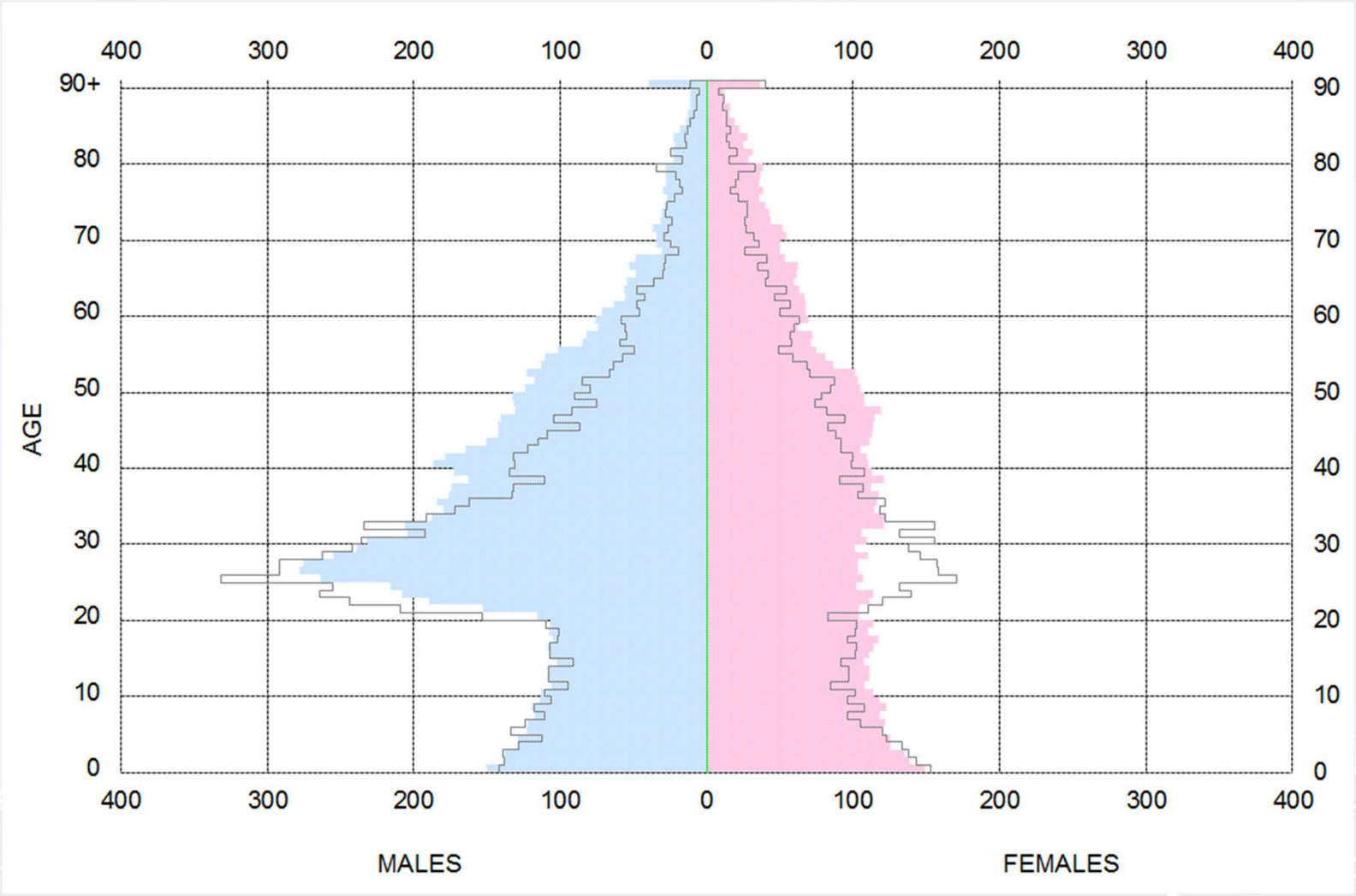
Gender bias

- Male and female migration rates/probabilities combined for most wards to reduce noise
- Separate male/female rates used if evidence of genuine difference in behaviour

Gender differences:
East Ham Central

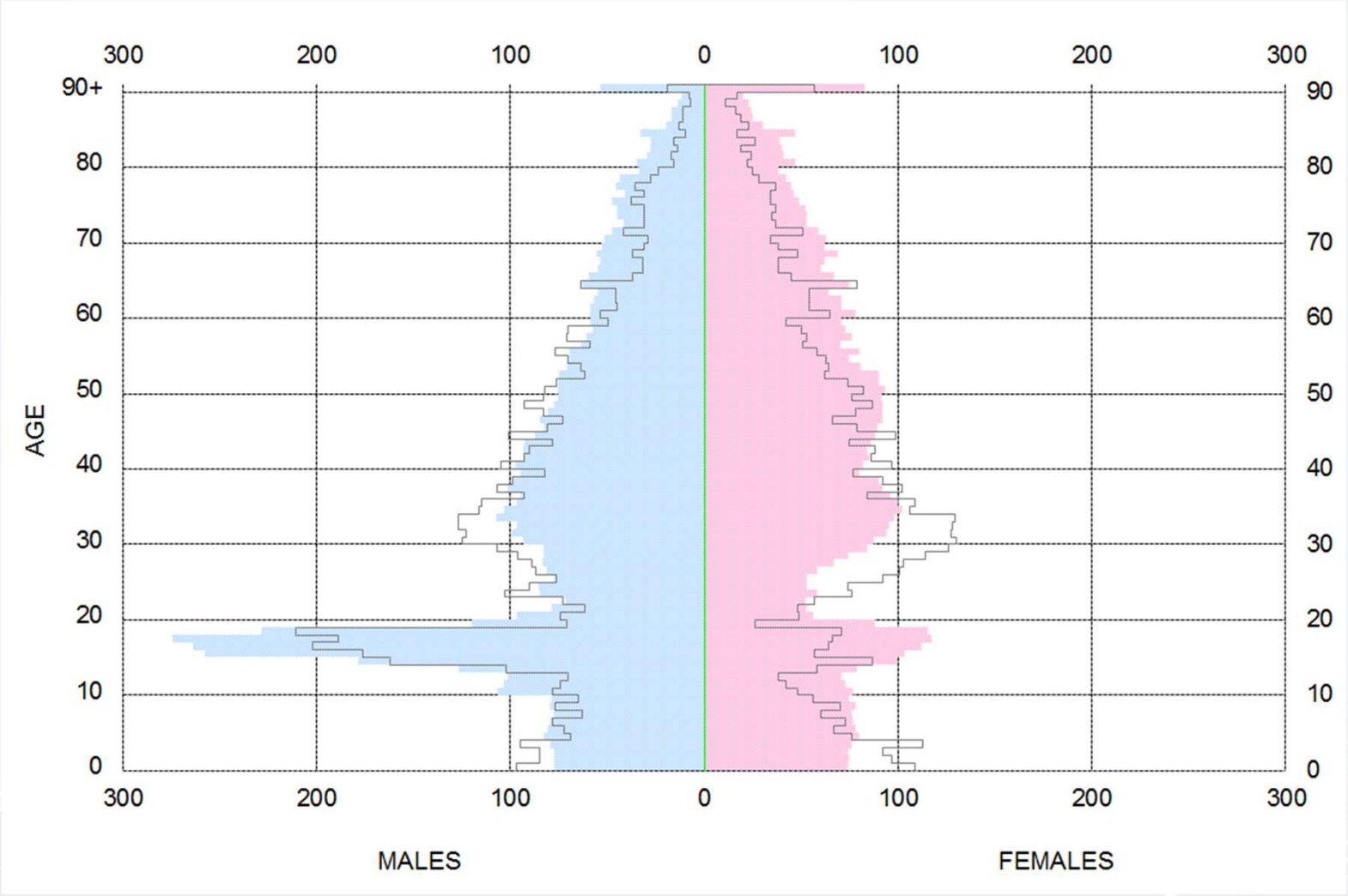


Example results: 2011 & 2031
East Ham Central



Example results: 2011 & 2031

Large CE population (Harrow on the Hill)



Future development

- Expansion of models to cover wider geographical area
- MSOA outputs
- Better account for characteristics of new housing
- Integration of additional data sources
  - GP registration counts
  - ONS admin-based estimates

Future development: Project Witan

- Joint project with Mastodon C to develop a new city modelling platform
- Funded by Innovate UK
- Allow closer integration of the organisation's models
  - Housing, demographic, economic, employment, energy use, etc.
- Modern data management and version control tools
- Web-based interface for local authority users
  - Allow them to create their own variants as required

Questions?

Contact:
ben.corr@london.gov.uk

Latest projections:
http://data.london.gov.uk/dataset/2014-round-population-projections

Recruitment:
http://www.london.gov.uk/city-hall/jobs/current-vacancies

School Roll Model

London

Ward level population projections

Outside London (ONS data)

- Census ward estimate
- Borough projected growth rates

National Pupil Database

Independent schools

Cross-ward pupil home to school travel

Current independent places estimate

number | percent

State school places projection by ward

number | percent

State school mobility model projections

number | percent

current | hybrid