CITY INTELLIGENCE

2019-based Trend Projections

Analysis of Variants

November 2020

Introduction

The GLA 2019-based trend population projections comprise four principal variants – the Central Range upper and lower bounds, a Low population variant and a High population variant. In addition to the principal variants there are five supplementary variants resulting from different combinations of migration assumptions. The supplementary variants were produced as part of the model development process and helped to form the context within which decisions about final model assumptions were made. Finally, there are five scenario projections designed to give insight into London's population change under specific circumstances or to test the interactions between components of population change.

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Projection naming

The primary variants are named based on the character of their population trajectory; they are the:

- High population,
- Central Upper Bound,
- Central Lower Bound, and
- Low population variants.

The supplementary variants are named based on their migration assumptions (see table). For clarity in the charts and text the labels in Table 1 are used throughout this document to refer to both the principal and supplementary variants.

Table 1: Variant projection naming

Label	International migration variant	Domestic migration variant	2019-based variant name
CC	Central	Central	Central Upper Bound
CH	Central	High	Central Lower Bound
CL	Central	Low	
HC	High	Central	High population
HH	High	High	
HL	High	Low	
LC	Low	Central	Low population
LH	Low	High	
LL	Low	Low	

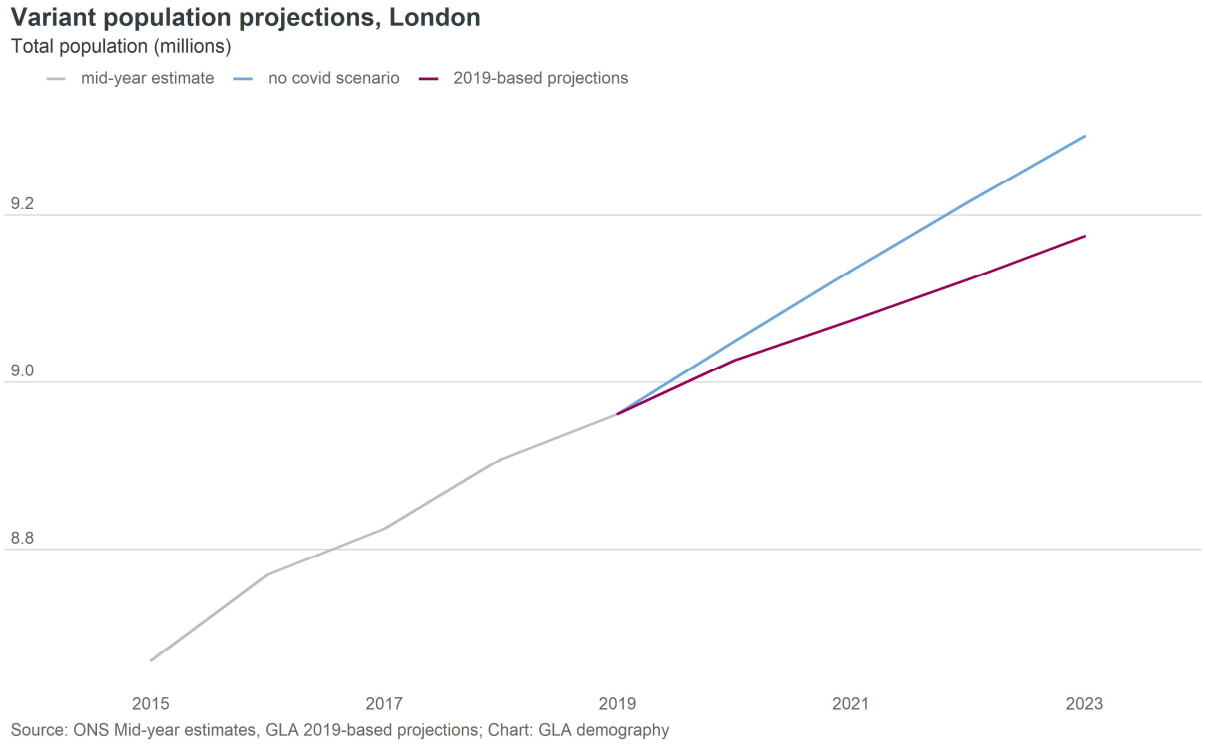
The scenario projections are named based on the main feature of the projection. Each projection also has a two-letter label to identify it.

Table 2: Scenario projection naming

Label	2019-based scenario name
NC	No covid
PD	Population decline
ZZ	Zero migration
AF	Average fertility
LF	Low NPP fertility

Covid period population projection

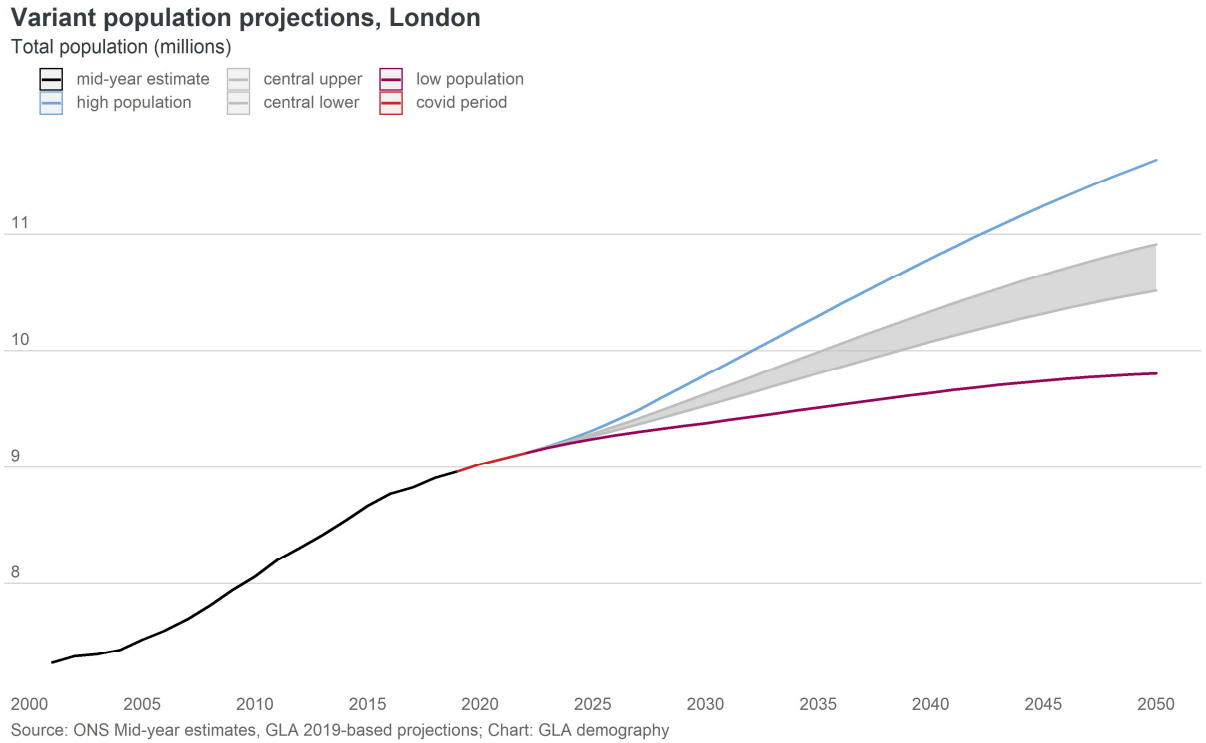
Each of the variants (with the expectation of the no-covid scenario) have the same assumptions and trajectory for the initial three years of the projection (2020-2022). This approach to modelling the *covid period* is outlined in the 2019-based projection results document on the London Datastore[1].



[1] https://data.london.gov.uk/demography/population-and-household-projections/

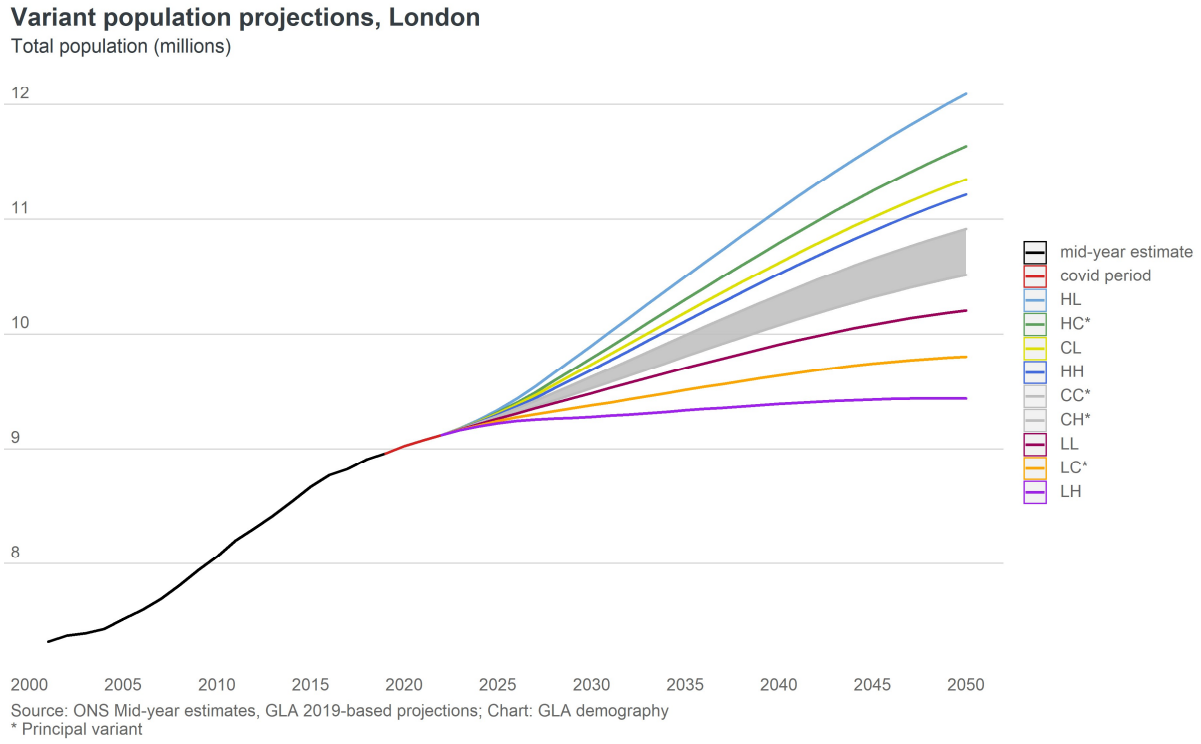
Principal variants

The four principal variants are shown in the chart below. A detailed overview of the results for the principal variants for London can be found in the 2019-based projection results document.



Supplementary variants

The five supplementary variants are the result of the interaction between different assumptions for international and domestic migration. Charts showing the components of change for all of the variant projections can be found in Appendix A of this document.



High international migration variants

The HH variant shows a trajectory in which both international and domestic migration levels are high. While this variant has the greatest population turnover of all the variants, the growth trajectory is not as significant as some of the other variants because the elements of the projection are in balance.

The HC variant forms the principal *High population* variant in the 2019-based projections. The level of international migration is still high, while domestic migration uses a 10-year average of migration rates. Levels of domestic migration here are high because this rates-based system and the rates are being applied to a population being grown by high international in migration.

The HL variant shows a population trajectory with high levels international migration and low levels of domestic migration. Under this variant, large international inflows to London are not balanced by the usual large domestic outflows and London's population increases quickly and significantly. Such a trajectory is based on a fundamental change in the established relationship between international and domestic migration.

Central international migration variants

The CH projection gives a trajectory based on a ten-year international migration average and a high (five-year) domestic migration average. This is the C*entral Lower* variant in the 2019-based projections. This projection shows conservative levels of international immigration with high levels of domestic outmigration giving an indication of London's growth where the capital's attractiveness is somewhat diminished.

The CC variant forms the C*entral Upper* variant in the 2019-based projections. This is a standard approach to projecting future growth using a ten-year average for both international and domestic migration. Like the HH and LL projections the two migration elements are in balance in this projection.

The CL variant holds international migration at its ten-year average but sees low domestic migration. Like the HL variant this seems to imply some sort of shift in the underlying relationship between international and domestic migration.

Low international migration variants

The LH variant provides a very flat population trajectory. This variant, much like the HL variant which provides the strongest growth trajectory, presupposes a significant change in the relationship between international and domestic migration. Here low levels of international in are matched by high levels of domestic out. This would represent a future where London's attractiveness both domestically and internationally was severely diminished.

The LC projection forms the *Low population* variant in the 2019-based projections. A low level of international migration is combined with a ten-year average of domestic rates. Domestic migration is supressed because of the lower population levels in London. However, domestic out is higher than in the LL projections and as a result London does not grow as quickly.

Finally, the LL variant is a low international and low domestic projection in which migration is supressed but balanced. The low levels of domestic migration mean that fewer people leave London, but this does not cause significant growth as fewer people are entering internationally.

Table 3: Variant population projections, London

	Population (millions)			Population change 2019-2050	
Variant	**2030**	**2040**	**2050**	**Change**	**Annualised**
HL	9.901	11.084	12.093	3,130,700	101,000
HC (High population)	9.791	10.793	11.637	2,674,500	86,300
CL	9.738	10.621	11.35	2,387,700	77,000
HH	9.689	10.523	11.216	2,254,100	72,700
CC (Central upper)	9.629	10.339	10.915	1,953,100	63,000
CH (Central lower)	9.528	10.078	10.516	1,554,000	50,100
LL	9.486	9.908	10.204	1,242,300	40,100
LC (Low population)	9.379	9.639	9.803	841,000	27,100
LH	9.279	9.391	9.437	474,700	15,300

Scenario projections

No covid scenario

This scenario provides a benchmark against which the variant projections can be contextualised. The scenario makes no account of the impacts of the COVID-19 pandemic either in mortality or migration. The migration assumptions used are the same as used in the CC variant (central international, central domestic). However, in this case those assumptions are applied to the entire projection period rather than the long-term only.

Figure: London population, no-covid scenario

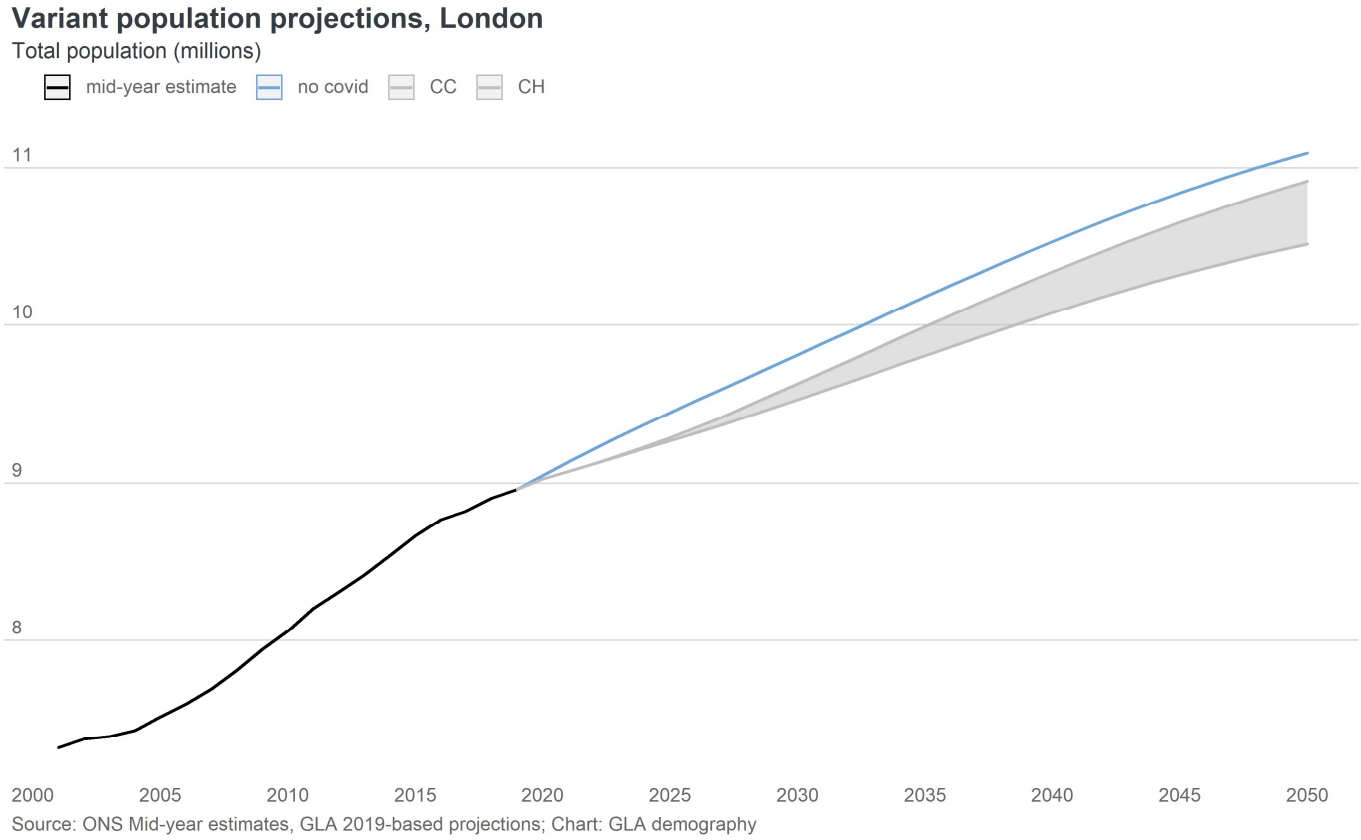


Table: Total population, No covid variant (millions)

Year	No covid	Central Upper (CC)	Difference
2020	9.049	9.026	23,000
2025	9.446	9.288	158,000
2030	9.811	9.629	182,000
2040	10.53	10.339	191,000
2050	11.094	10.915	179,000

Population decline scenario

This scenario is intended to give insight into the circumstances under which London's population might begin to decline. The population of London has grown consistently since the late-1980s, and for much of the last decade growth has exceeded 100,000 persons per year. A scenario in which this established growth trend is reversed would represent a step-change in both the character and level of migration flows as well as a change in the relationship between international and domestic migration.

London acts as an attractor, particularly to young people in their 20s, both domestically and internationally. As these people age into their 30s and start families they begin to out-migrate to other parts of the UK – either the commuter belt or further afield. The high level of domestic outmigration (~250,000 per annum) is balanced high domestic inflow (~200,000 per annum).

In this negative growth scenario that relationship is changed. This variant adjusts migration assumptions so that out-migration from London is high while in migration to London is low. This imbalance represents a significant change in the structure of UK migration as observed over the last two decades.

Migration from London boroughs to areas outside London uses 2017 domestic migration rates. That year marked the recent peak in domestic migration (336,000 outflow). Migration to London boroughs from other parts of the UK uses 2008 domestic migration. That year marked the low point in recent domestic migration flows associated with the last recession (192,200 inflow). Rates of migration for flows which do not cross the London regional boundary are held at the central ten-year average. This system of rates is assumed to hold throughout the projection period from 2021 onwards.

International migration uses the low migration scenario of 50,000 net migrants to London per year.

Under this scenario London's population peaks in 2025 at 9.190 million before declining to a level of 8.824 million in 2050. Over the period 2030-2050 the population decreases by an average pf 14,500 persons per year.

Figure: London population, population decline scenario

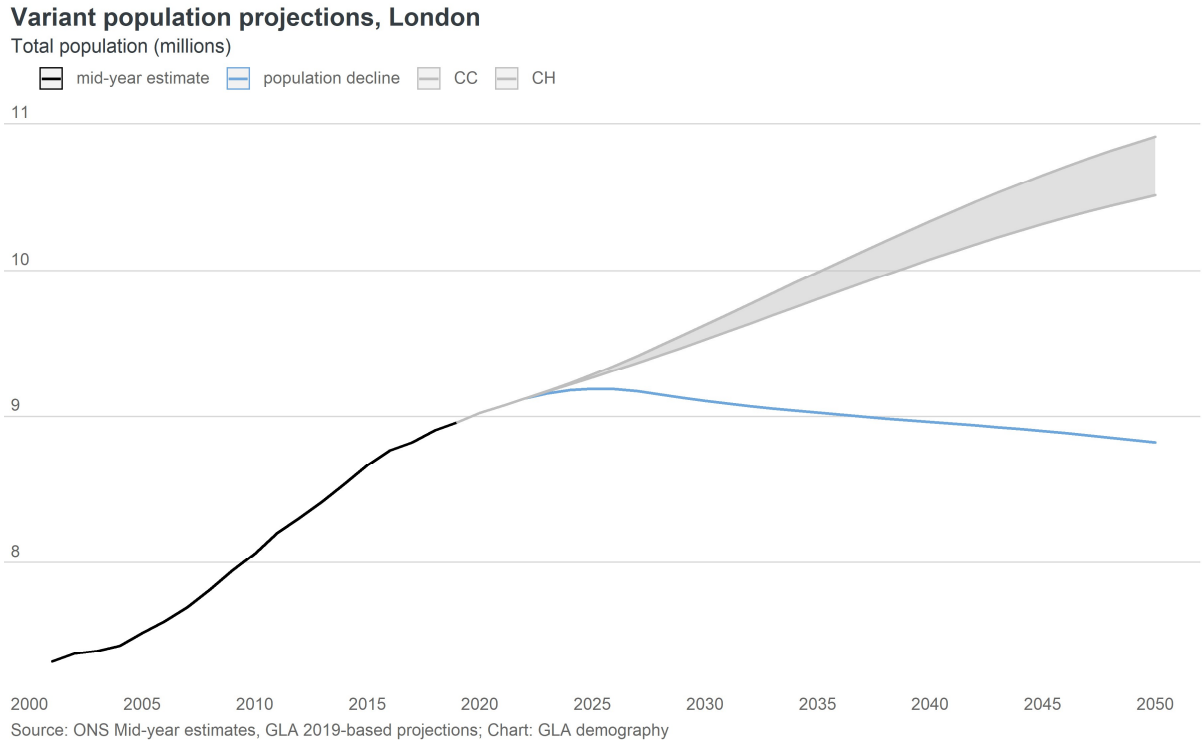
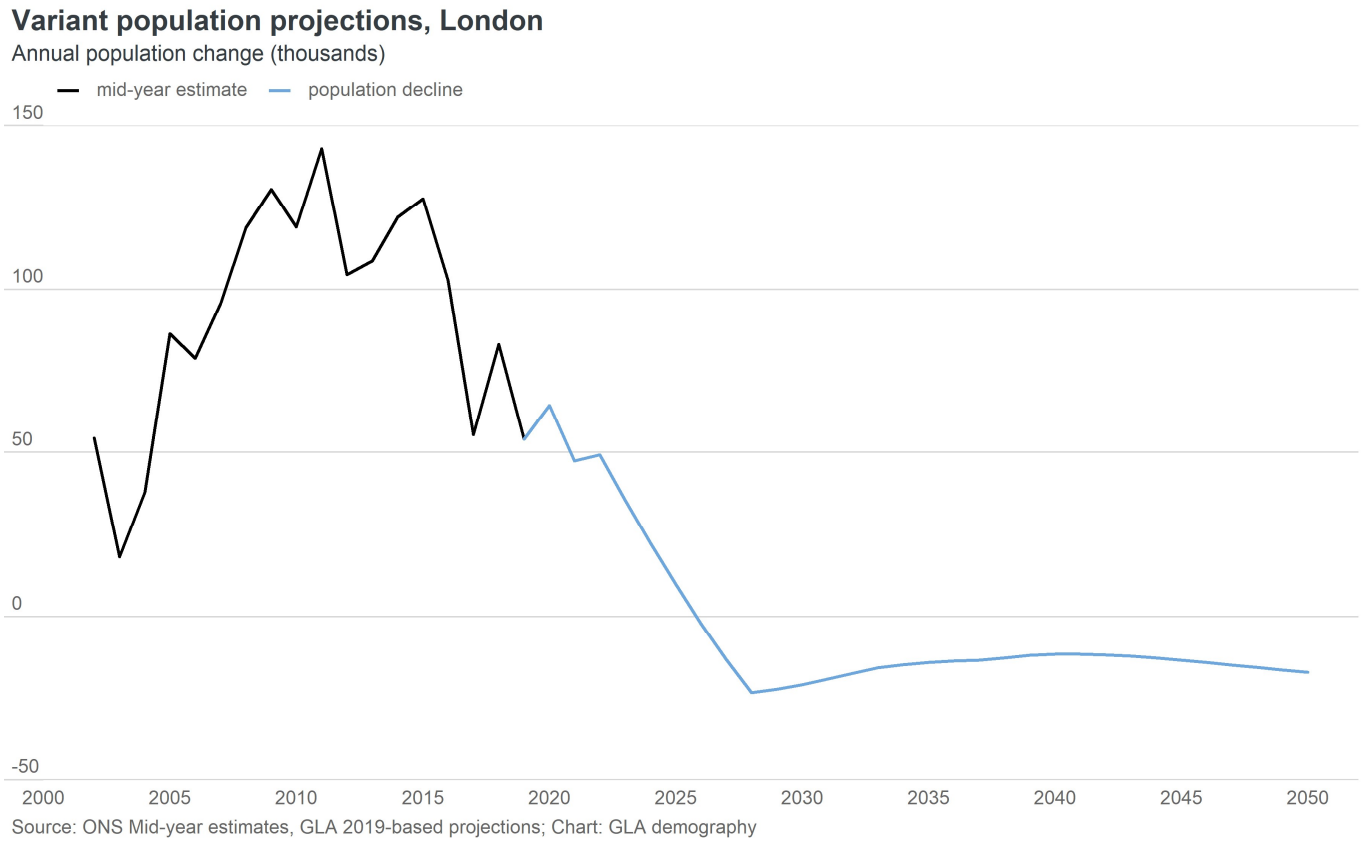
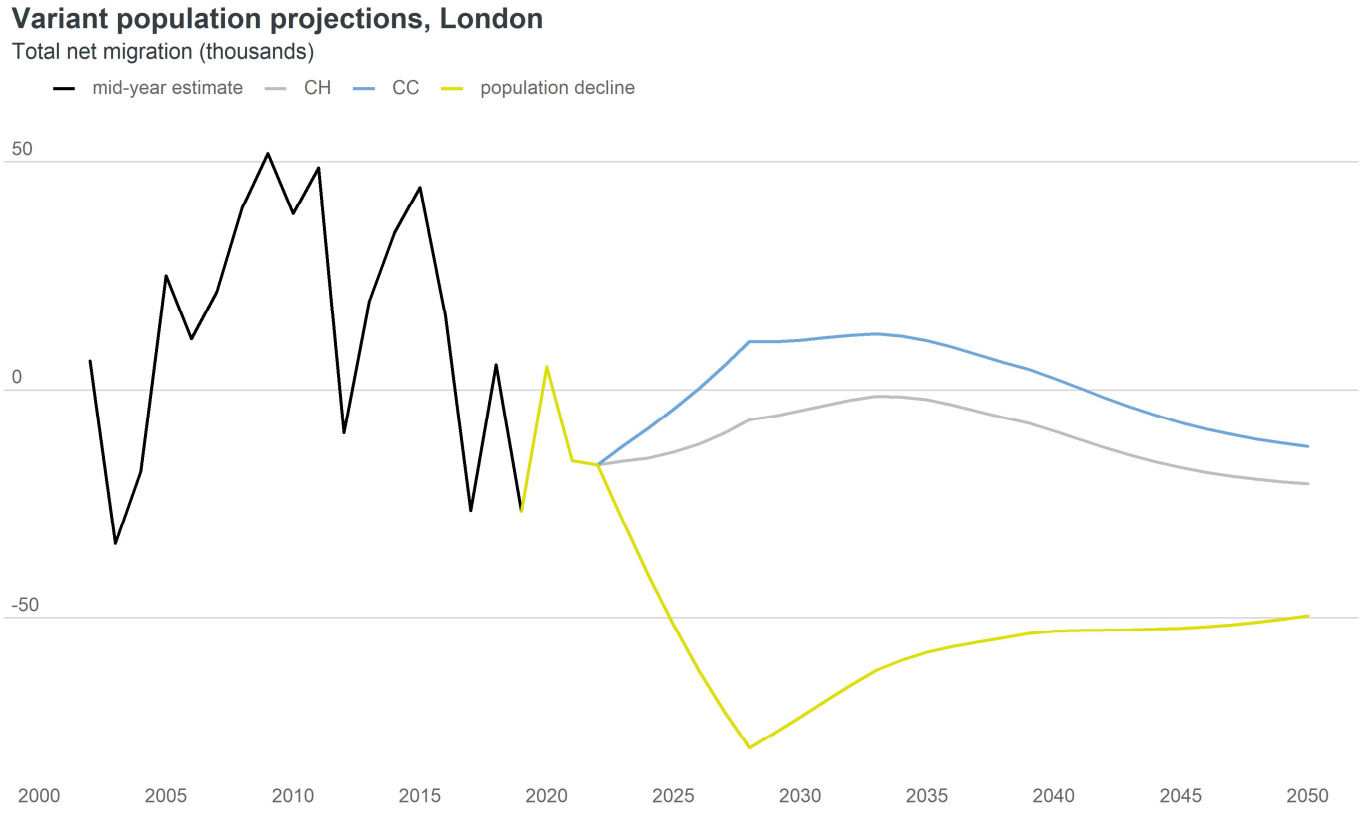


Figure: Annual population change, population decline scenario



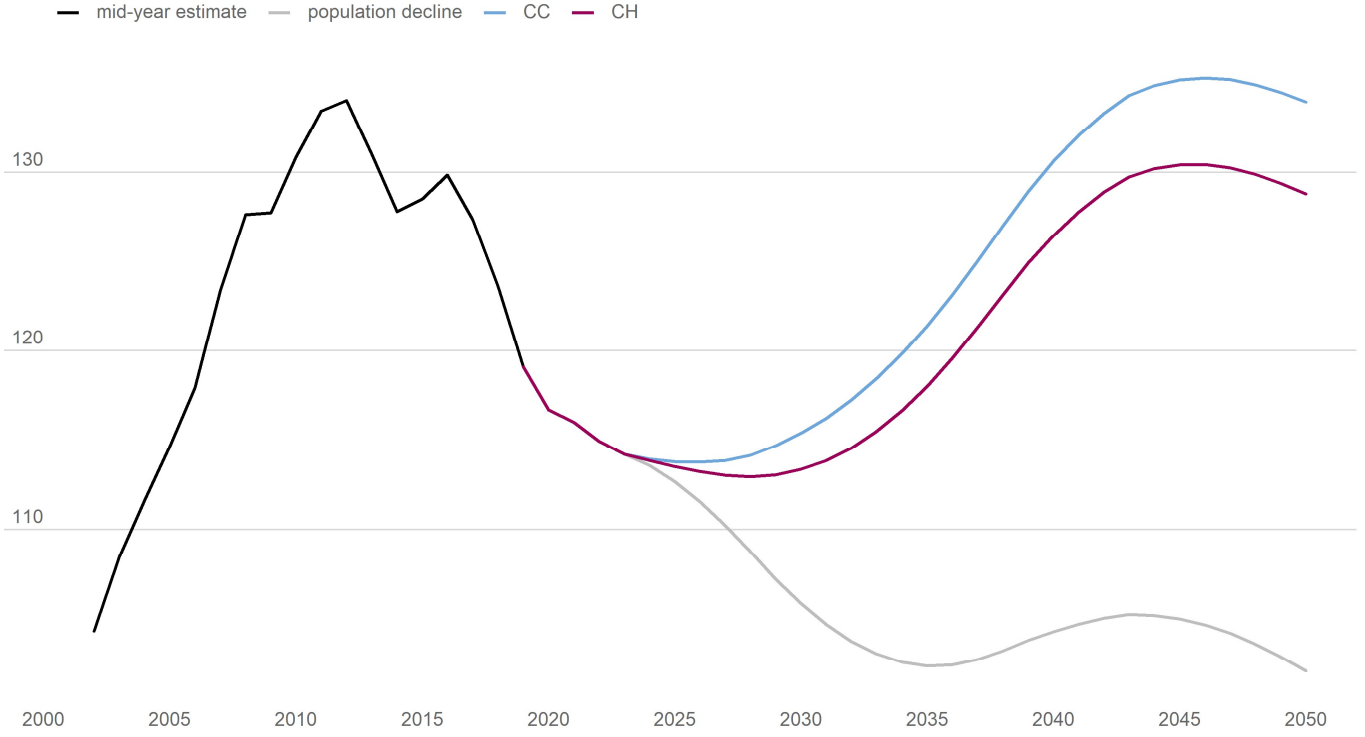
Total net migration from London is a projected outflow of 79,000 in 2020. As London's population begins to fall, the level of domestic out migration (which is rate based) also begins to fall while net international in-migration remains constant. As a result, total net outflow decreases over the projection period down to -46,000 in 2050. For context, the average level of total net migration over the last 20 years has been an inflow of 18,000 and the flow has been negative in only four of those years. An outflow of between 46,000 and 79,000 is therefore significant.

Figure: London net migration, population decline scenario



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography

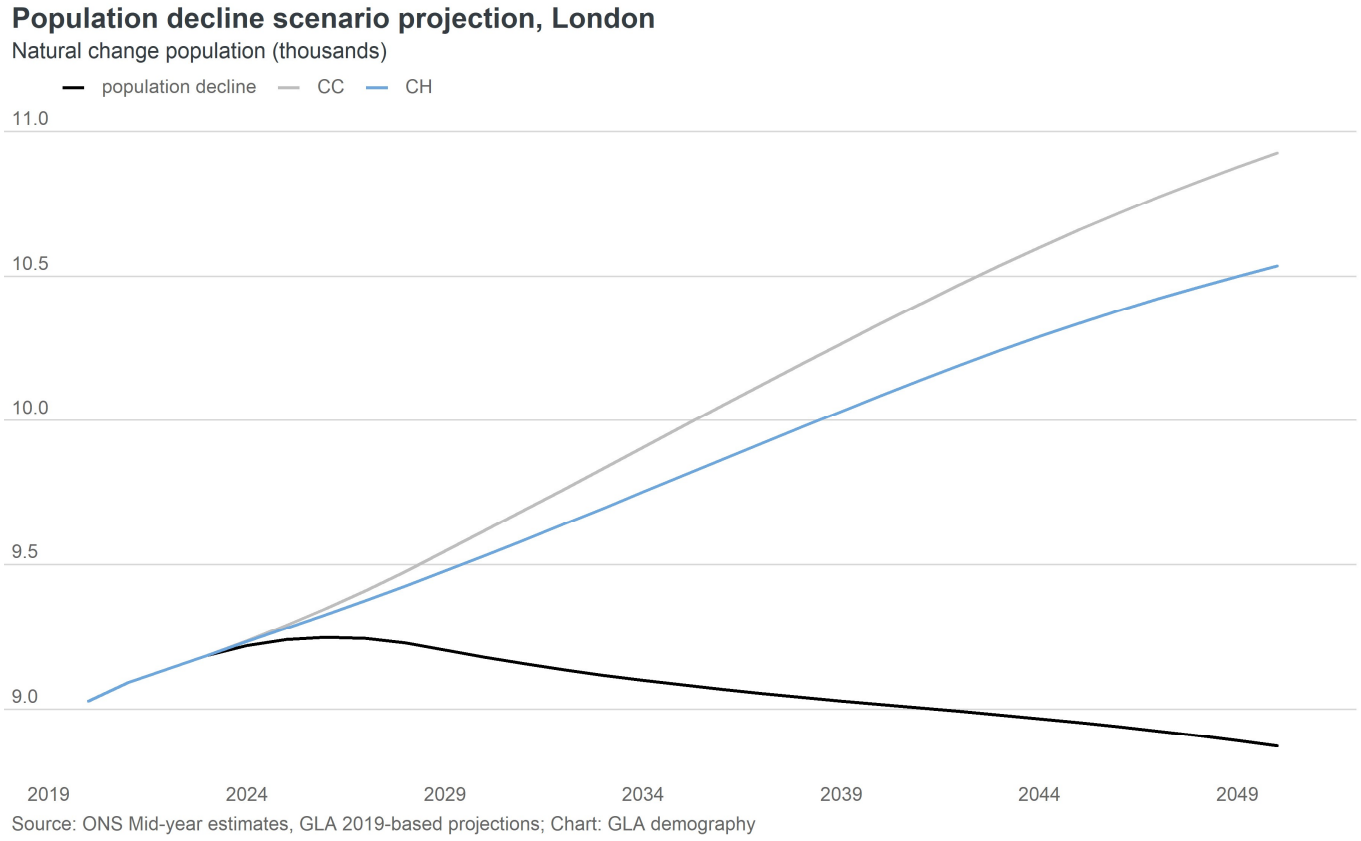
Figure: Births, population decline scenario



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography

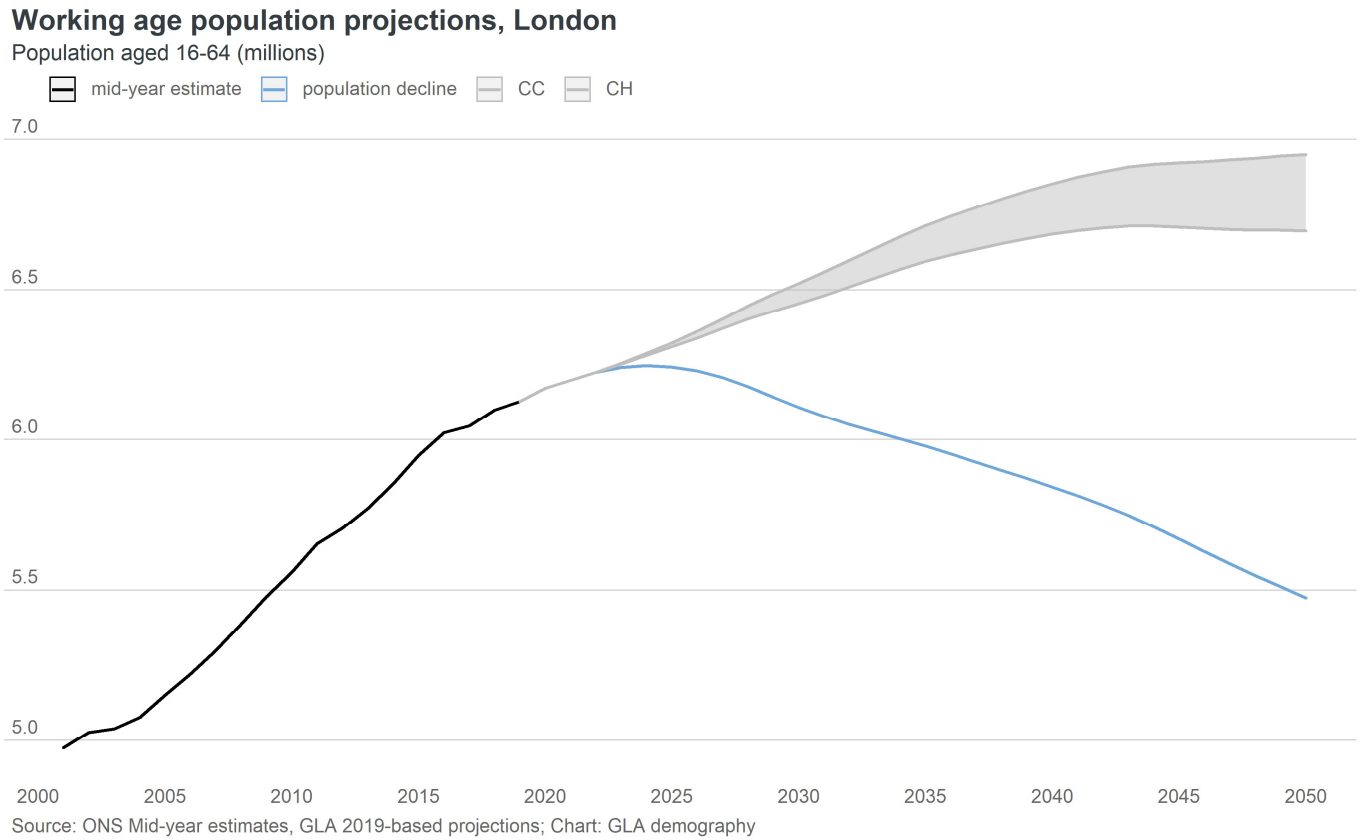
The pressure of high net outmigration is balanced by the effect of natural change in the population. Births outweigh deaths in London by a significant margin and as such natural change adds consistently to the population counteracting the effect of out migration and lessening the overall rate of population decline. Under this scenario, births do not fall lower than 99,800 over the projection period. Deaths increase over the projection in line with the other variants as the population ages. Natural change declines from 67,000 in 2020 down to 38,000 in 2050.

Figure: Natural change, population decline scenario



The decline in population is most evident among the working-age population. This is the section of the population most impacted by changes to migration behaviours. The 2019 mid-year estimate working-age population for London was 6.129 million. In this scenario the population grows to 6.249 million in 2024 before beginning to fall. Over the remaining years the population declines by 773,900 persons (a 12% reduction) to reach 5.475 million in 2050 – close to the size of the working age population in 2009.

Figure: Working age population, population decline scenario



This scenario represents a set of circumstances under which London's population would decline. It serves to show the extent to which migration flows would need to be altered in order for London's growth to be reversed. In this scenario annual population decline over the projection period is 8,000-18,000 persons per year. This is in the context of recent growth of 50,000-100,000. This scenario gives a useful indication of the minimum amount of change to the system required for the population to decline.

Zero migration scenario

Natural change (the balance of births versus deaths) is a significant contributor to population change in London. A high proportion of London's population are 'young adults' where family formation and fertility rates are at their peak. This scenario shows how London's population might respond if all migration stopped. There are no longer large flows of international in migrants but there are also no domestic out migrants. Many of the out migrants from London are children who leave with their families and so stopping domestic migration results in significant growth in the population and has major implications for the age structure.

Figure: London population, zero migration scenario

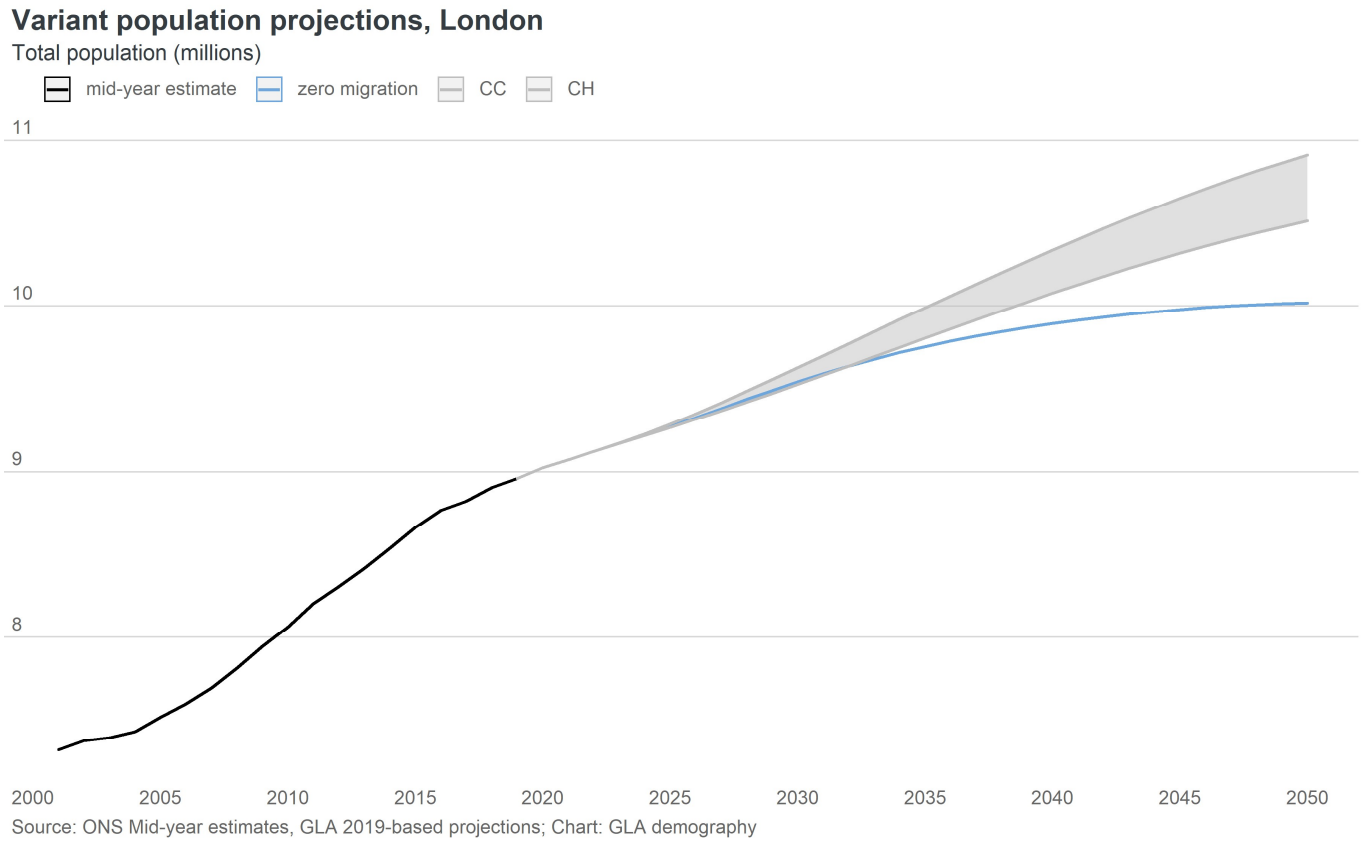
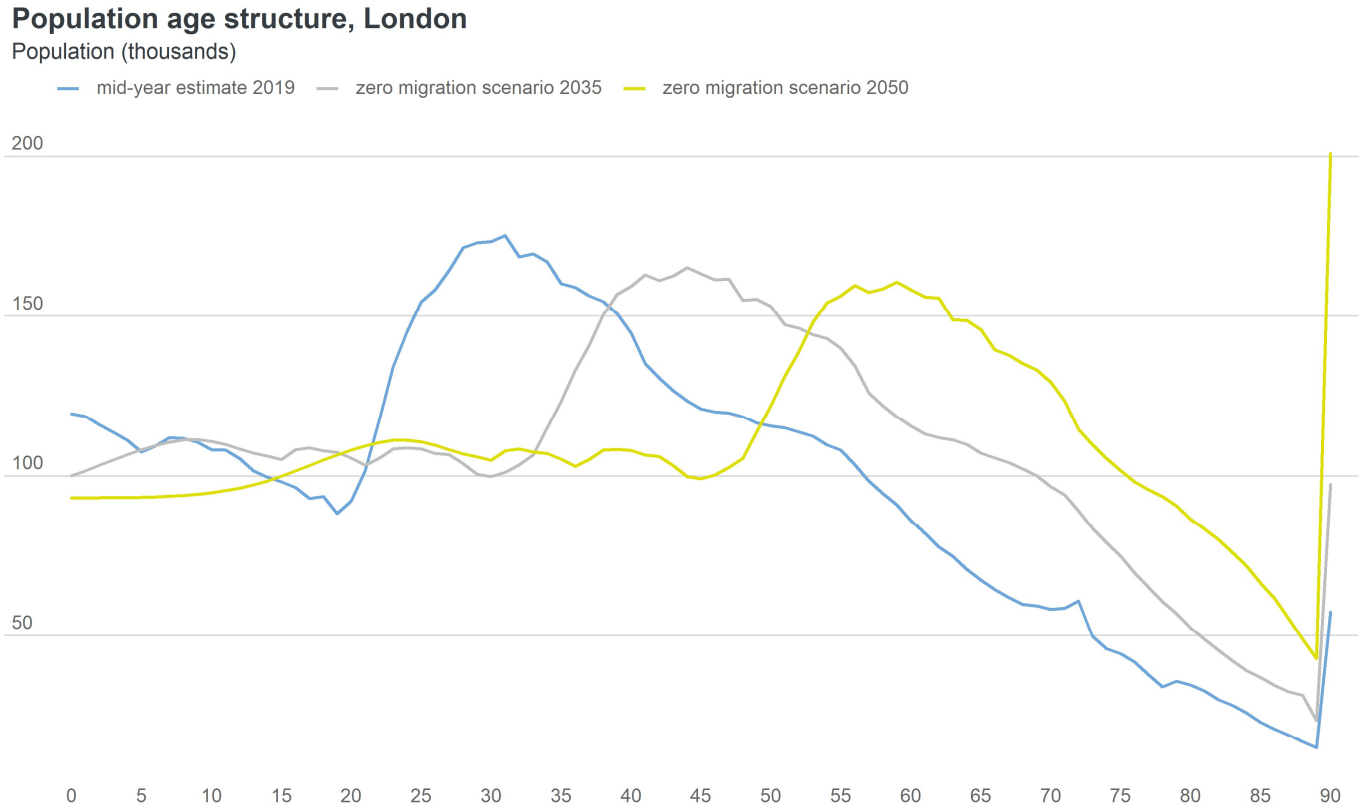
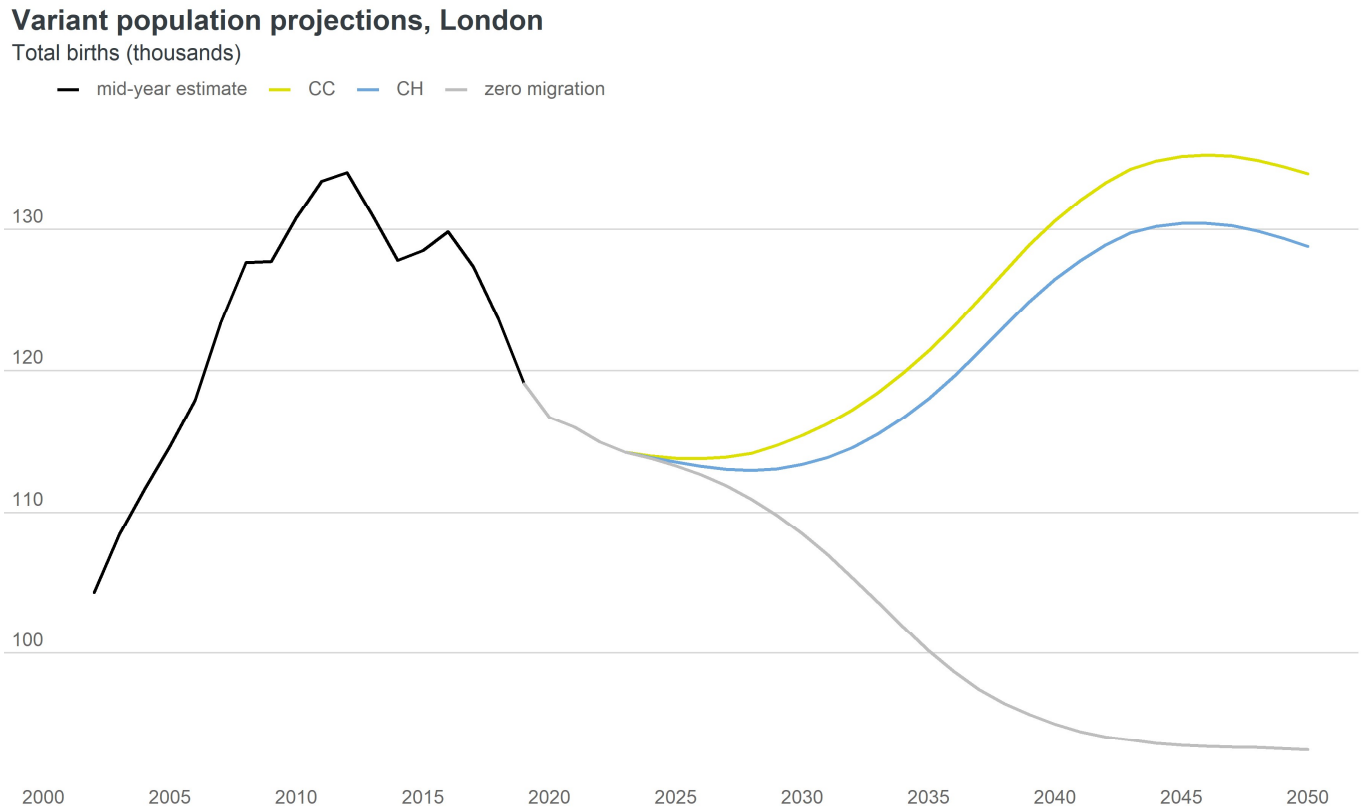


Figure: Age structure, zero migration scenario



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography

Figure: London births, zero migration scenario



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography

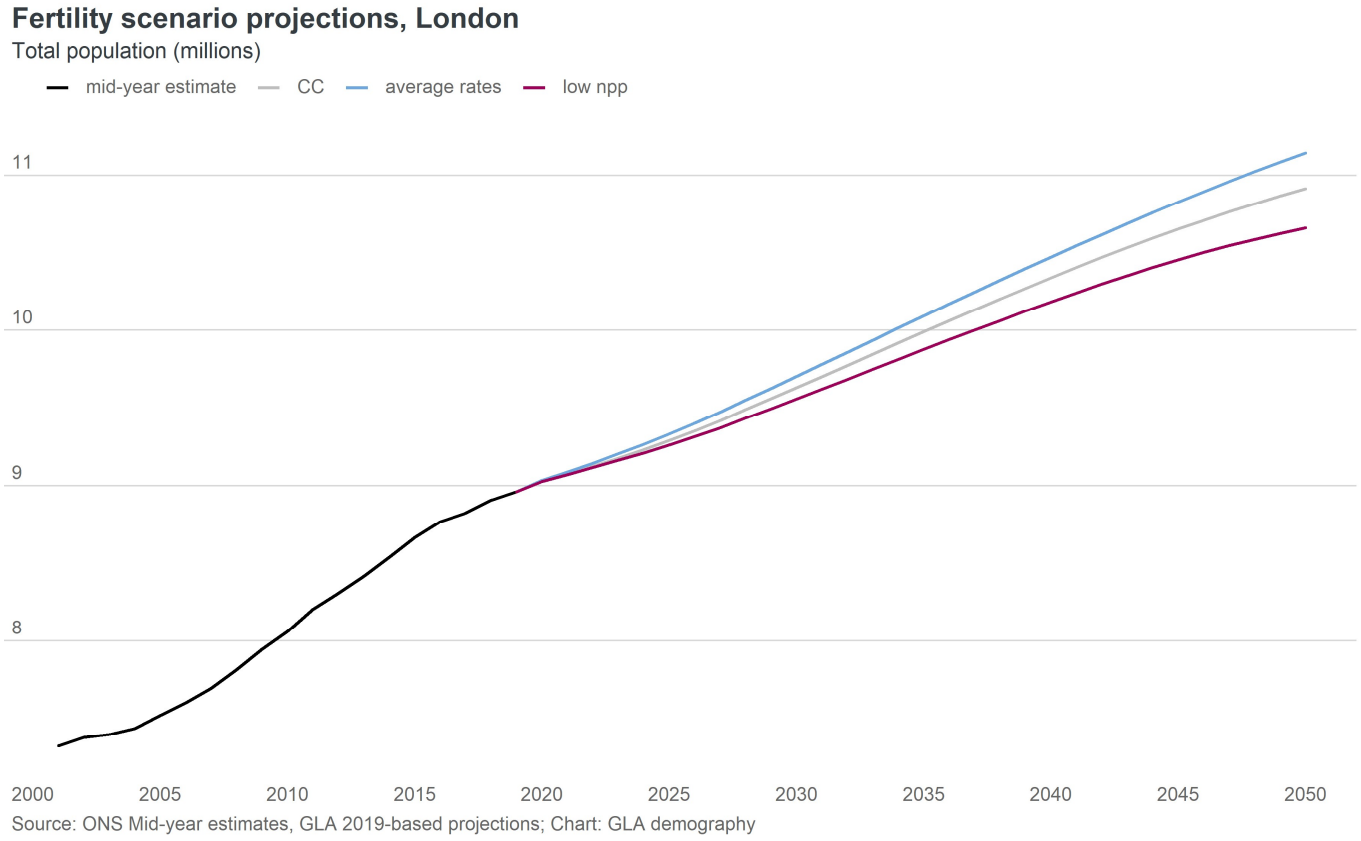
Fertility scenario sensitivity analysis

The fertility assumptions in all of the variant projections are the same. Initial year fertility rates (2020) are calculated by trending forward the rates for the five-year period 2015-2019. For years 2021 and beyond the initial rates are adjusted by the amount of change seen in the National Population Projections (NPP) principal fertility assumptions.

In the development of the 2019-based variant projections two alternative approaches to calculating fertility rates were considered. In the first (the *Average rates scenario*) the initial year rates are calculated by averaging the last five years rates rather than trending them forward. These initial rates are then projected using the same NPP principal projection.

In the second alternative (the *Low NPP scenario*) the initial rates are calculated by trending but rates for 2021 onwards are achieved by applying the NPP low fertility assumptions.

Figure: Fertility rates scenario projections



The *Average rates* scenario produces a higher trajectory than the CC variant. This is because fertility rates in many authorities have been falling over the past few years. A trended fertility rate will continue this trend and produce rates which are lower for 2020. The averaging of the same period will create higher rates for 2020. The same principal NPP is applied to both the CC and the *Average rates* scenarios.

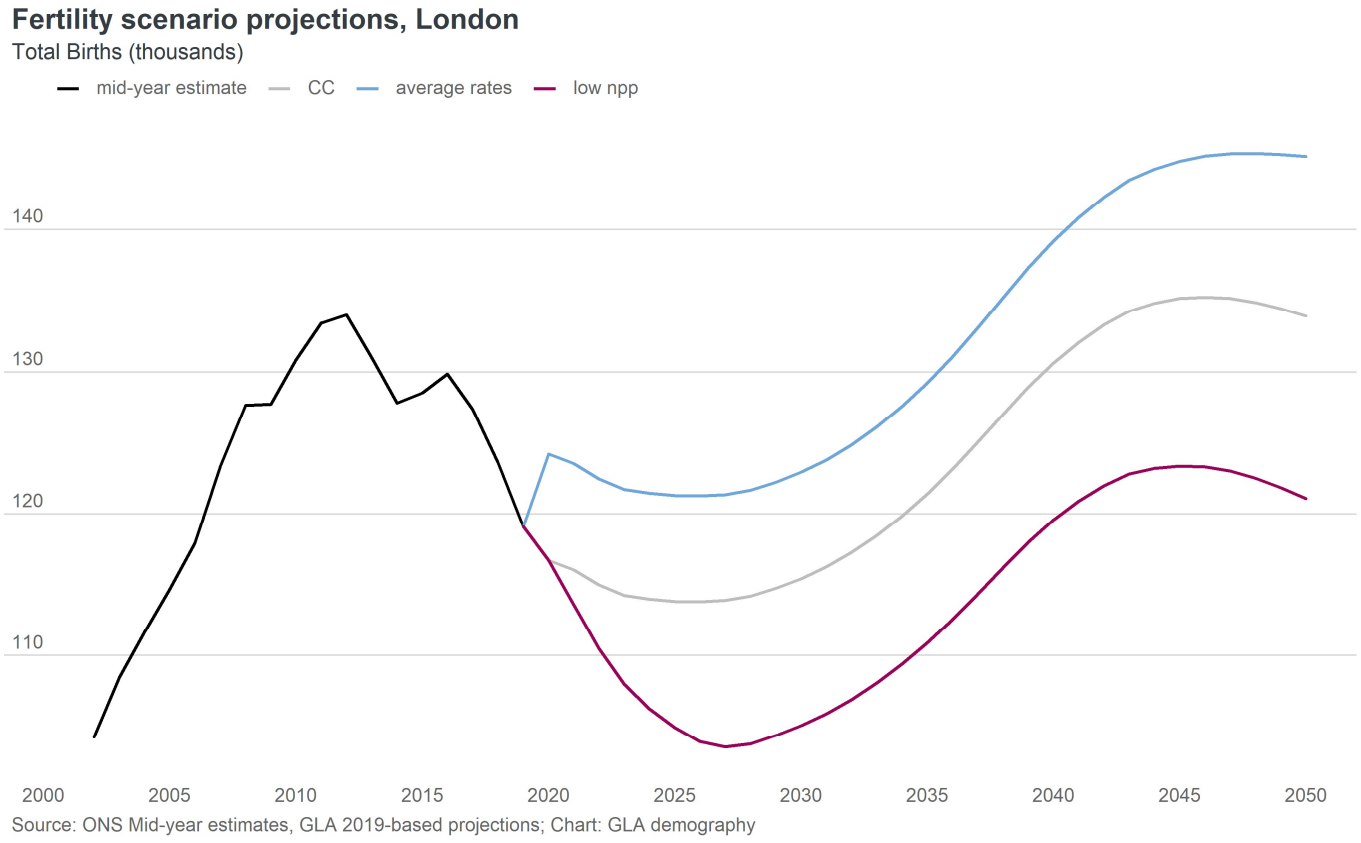
The *Low NPP* scenario has a lower growth trajectory. In this scenario the initial rates are the same as in the CC projection, but future rates are calculated on a trajectory in which fertility in young women declines more rapidly and fertility in older women increases at a slower rate.

Table: Fertility scenarios total population, London (millions)

Year	CC (central upper)	Average rates	Low NPP
2019	8.962	8.962	8.962
2020	9.026	9.034	9.026
2030	9.629	9.702	9.556
2040	10.339	10.473	10.184
2050	10.915	11.143	10.661

In the figure below the impact of choosing an average over a trend for the first year's rates can be seen in the difference in births between the *Average rates scenario* and the other two projections. In the CC and *Low NPP* projections there are 116,700 births in 2020 while in the *Average rates* projections there are 124,200 births – a 7,500-person difference.

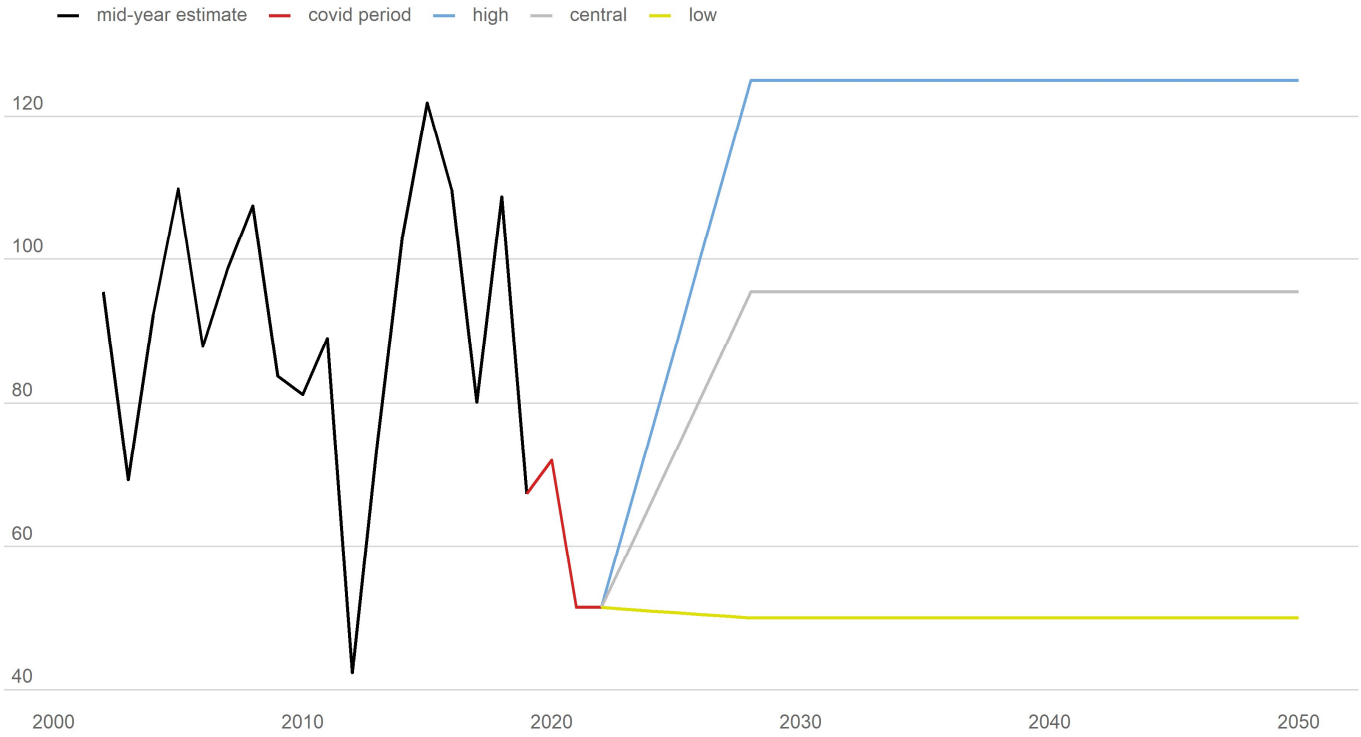
Figure: Births, fertility scenarios



Appendix A: Variant projections components of change

Net international migration, London

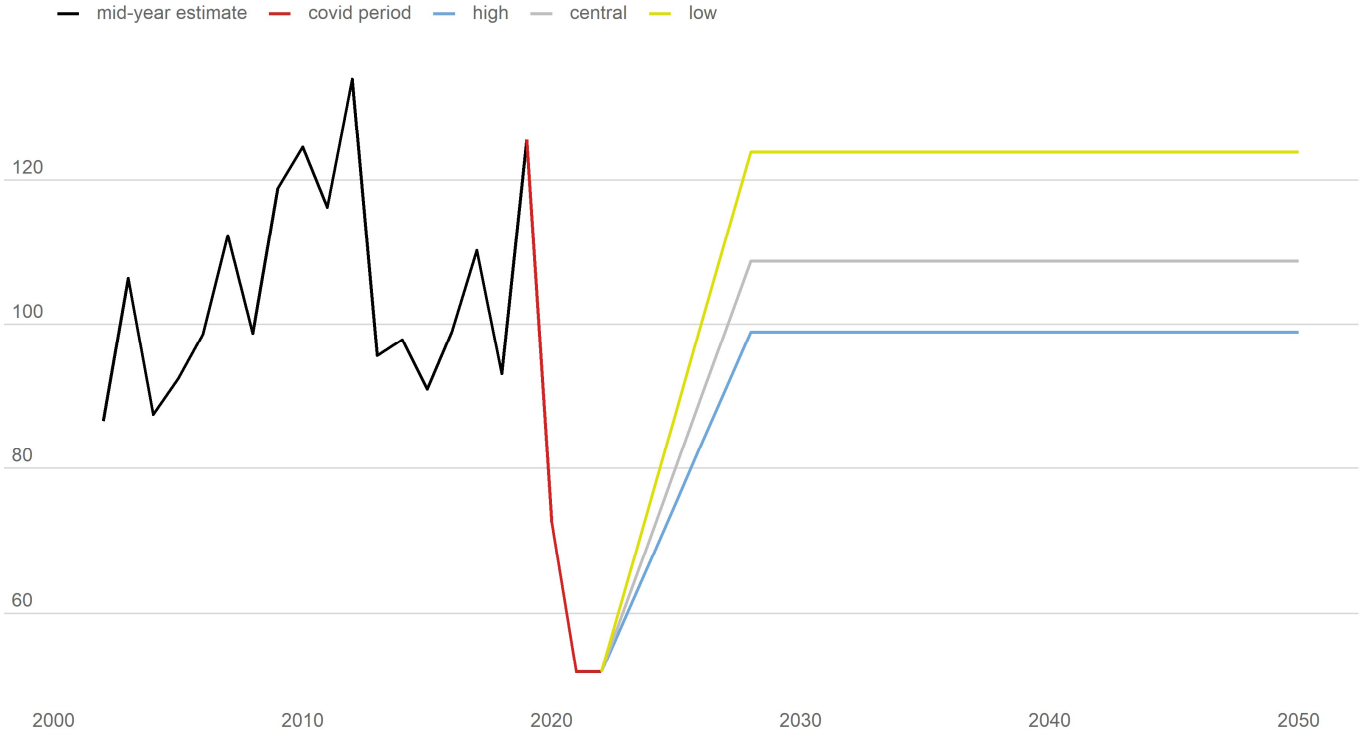
Persons (thousands)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography

International out migration, London

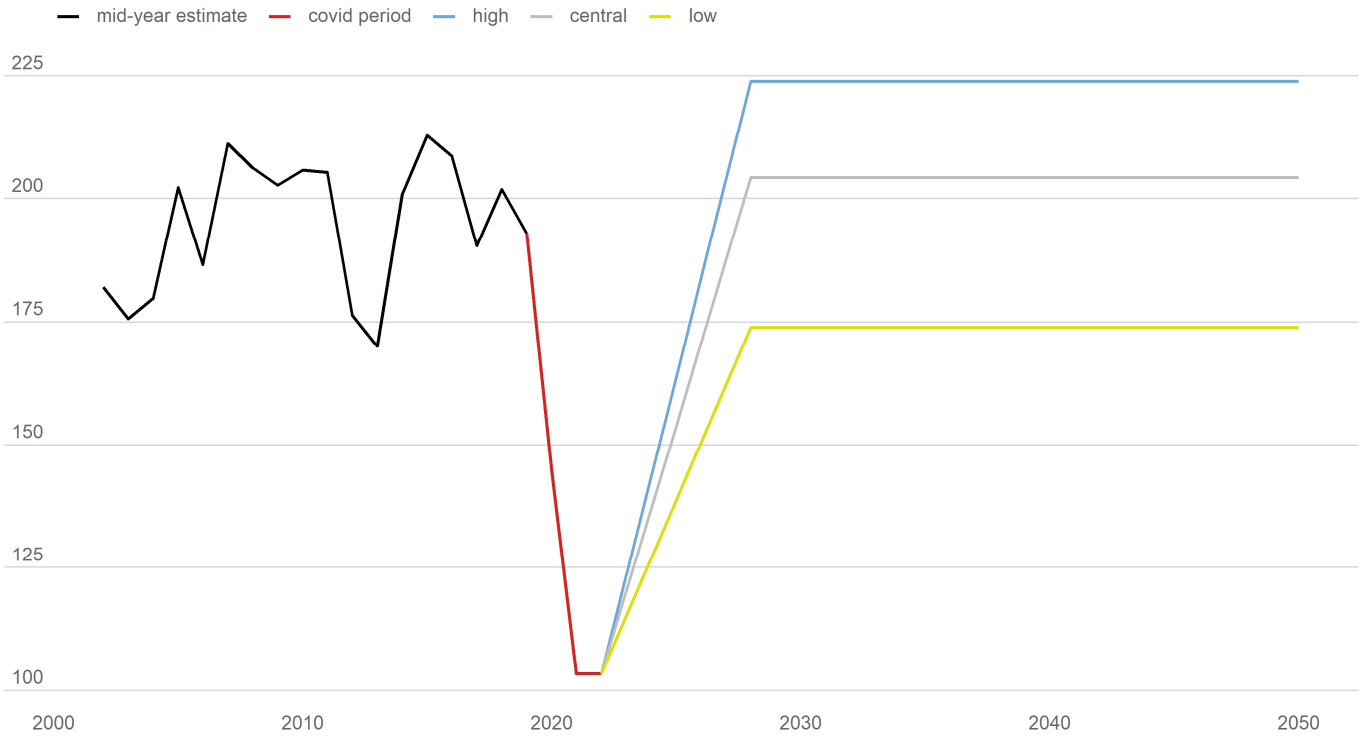
Persons (thousands)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography

International in migration, London

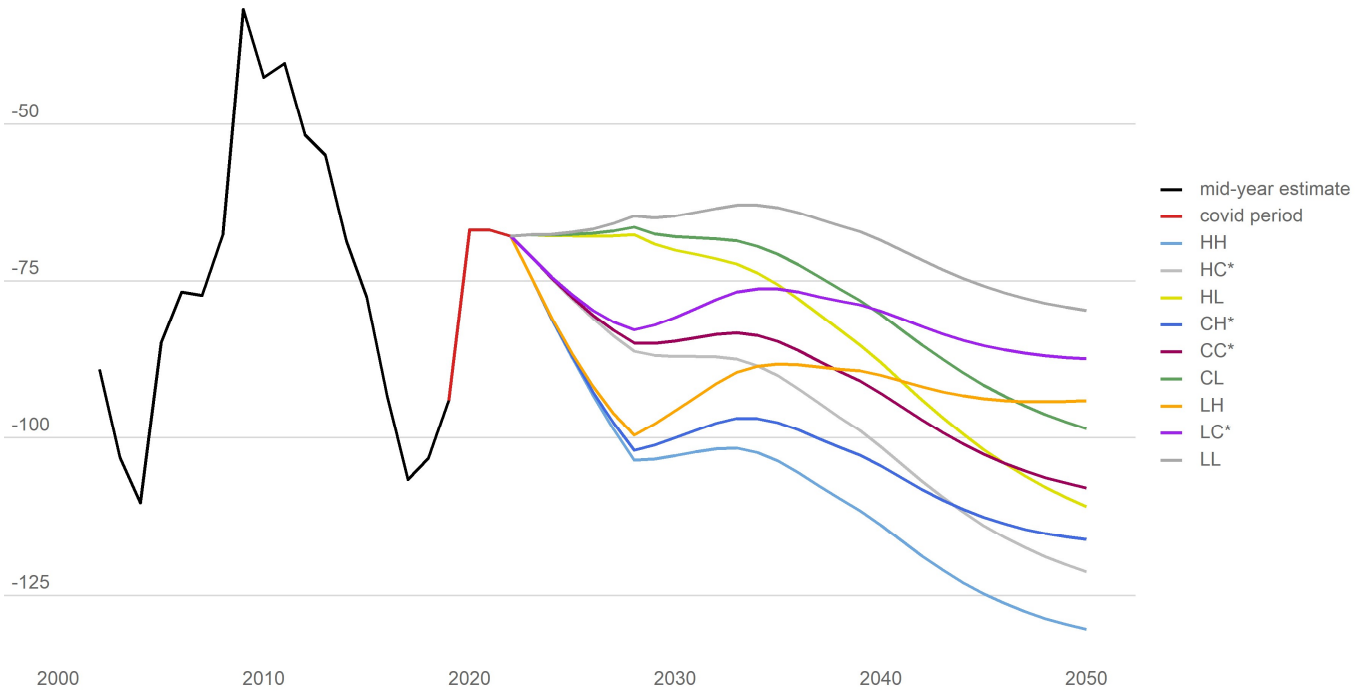
Persons (thousands)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography

Net domestic migration, London

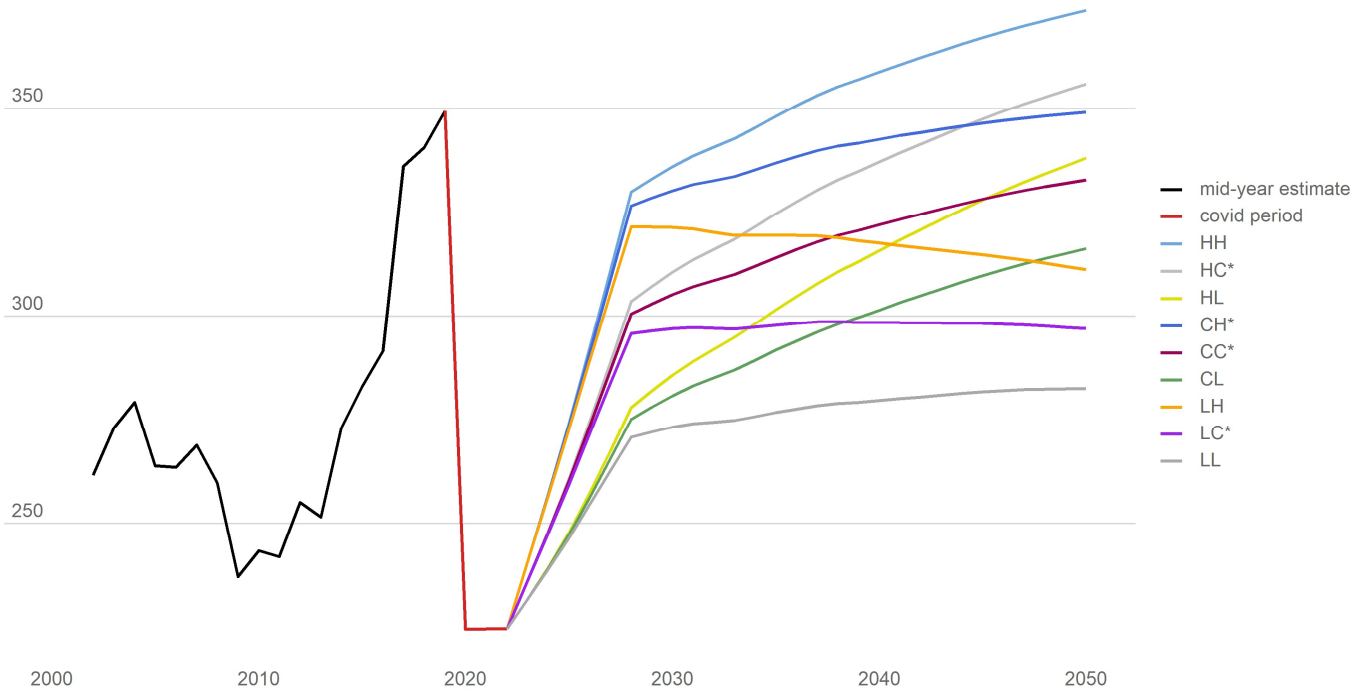
Persons (thousands)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography
* princial projection

Domestic out migration, London

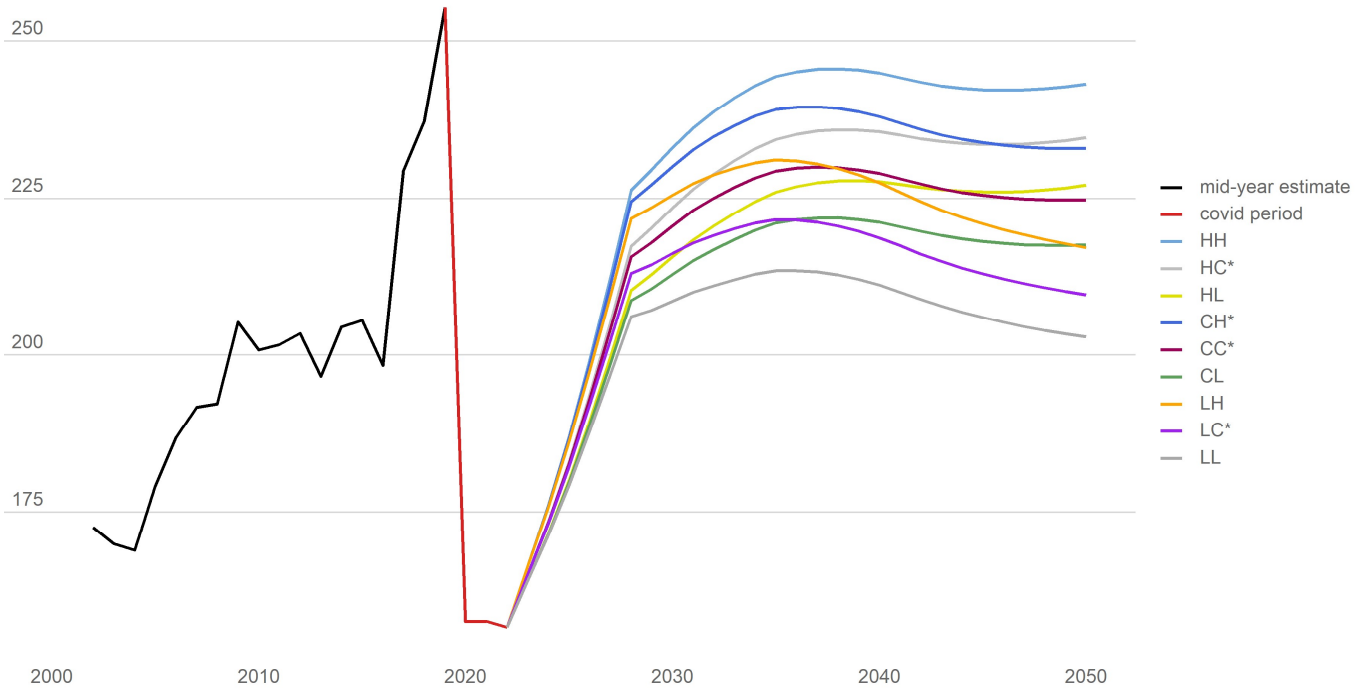
Persons (thousands)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography
* princial projection

Domestic in migration, London

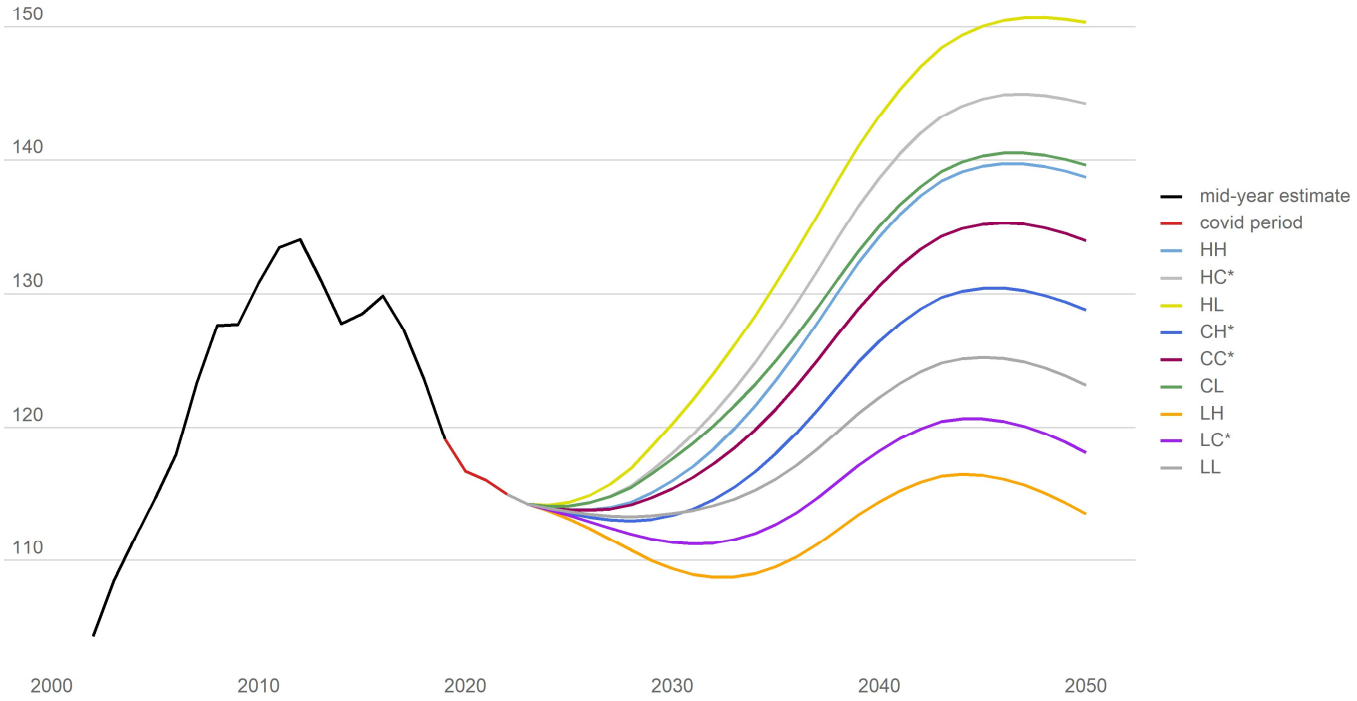
Persons (thousands)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography
* princial projection

Total births, London

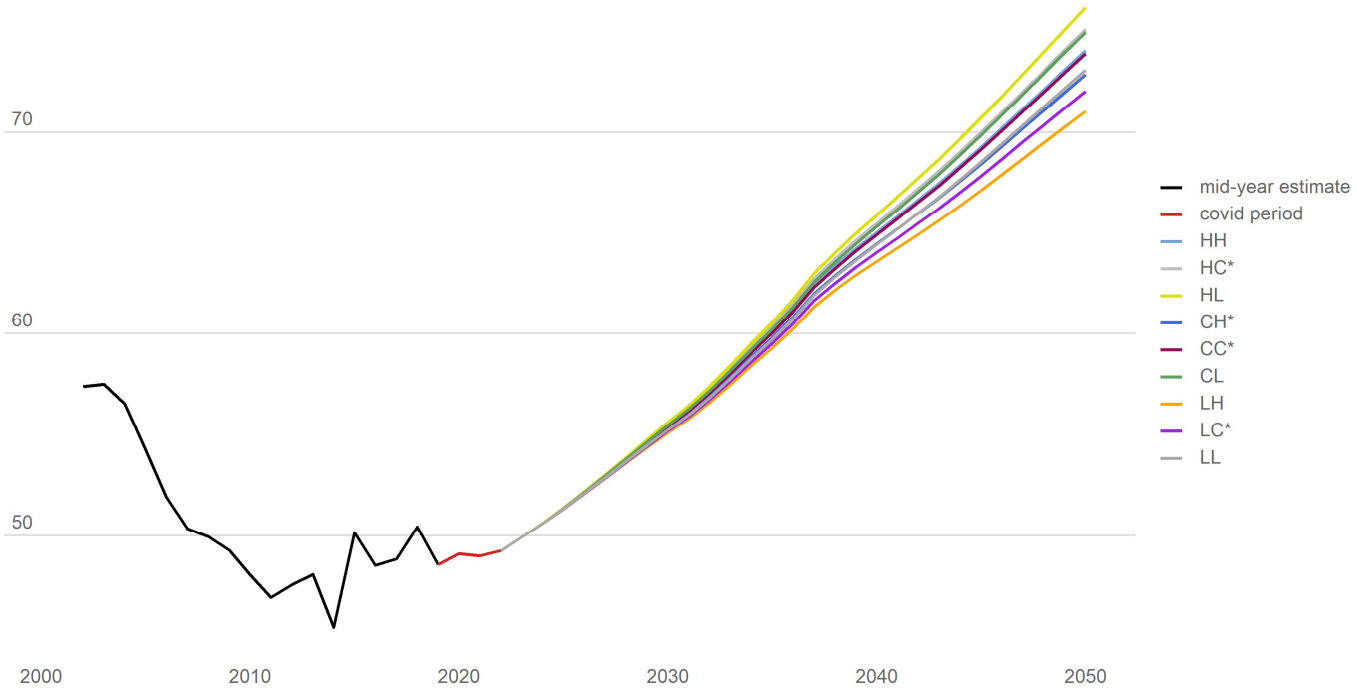
Persons (thousands)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography
* princial projection

Total deaths, London

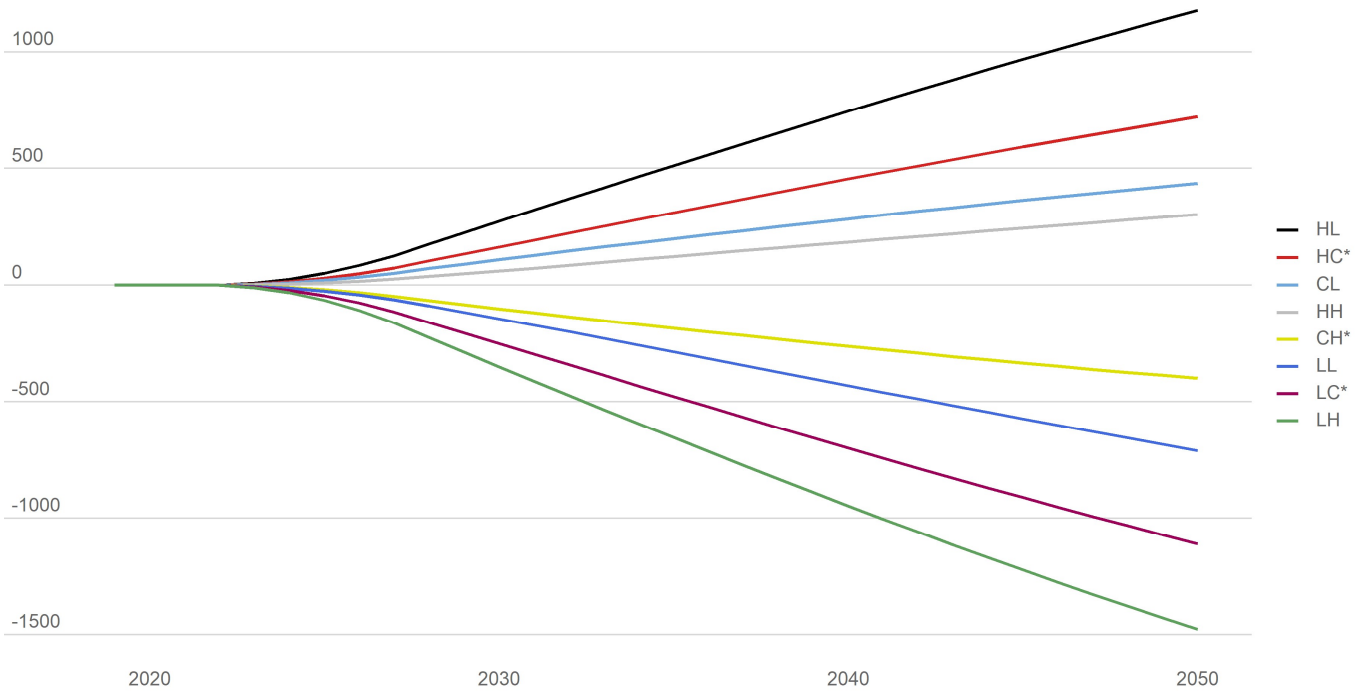
Persons (thousands)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography
* princial projection

Population difference compared to CC projection

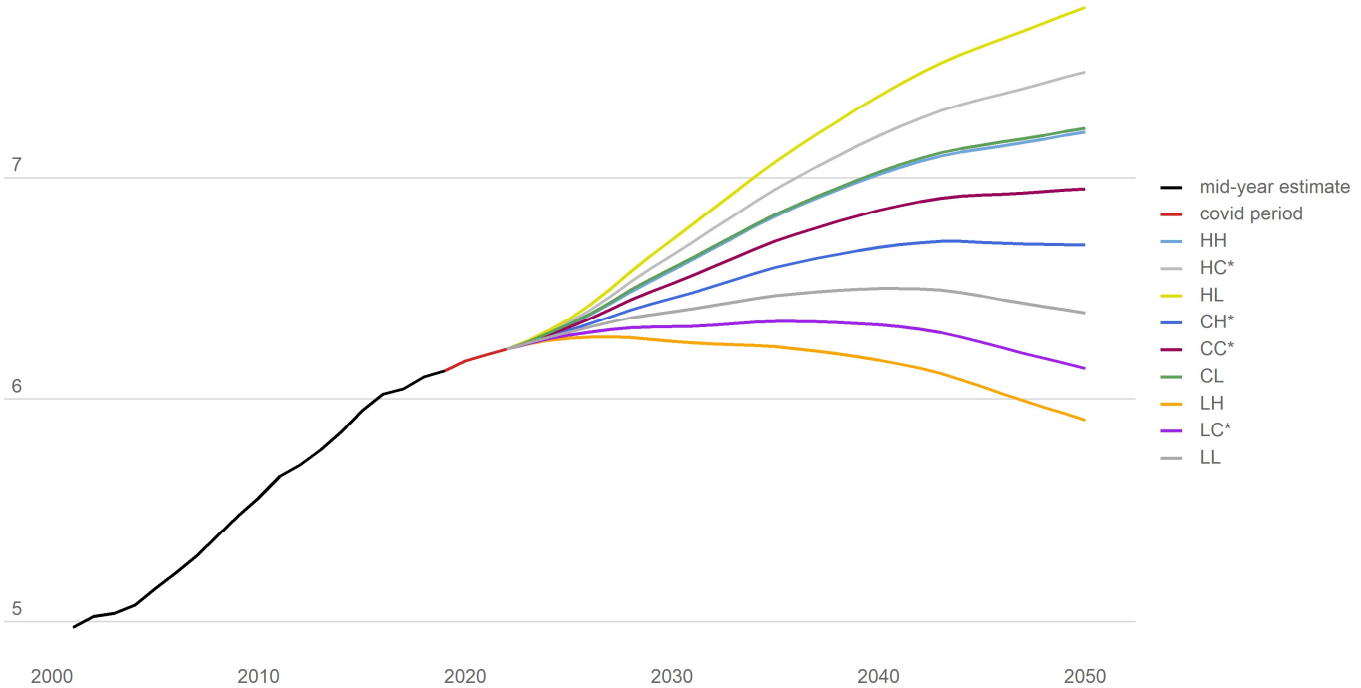
Persons (thousands)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography
* princial projection

Working-age population, London

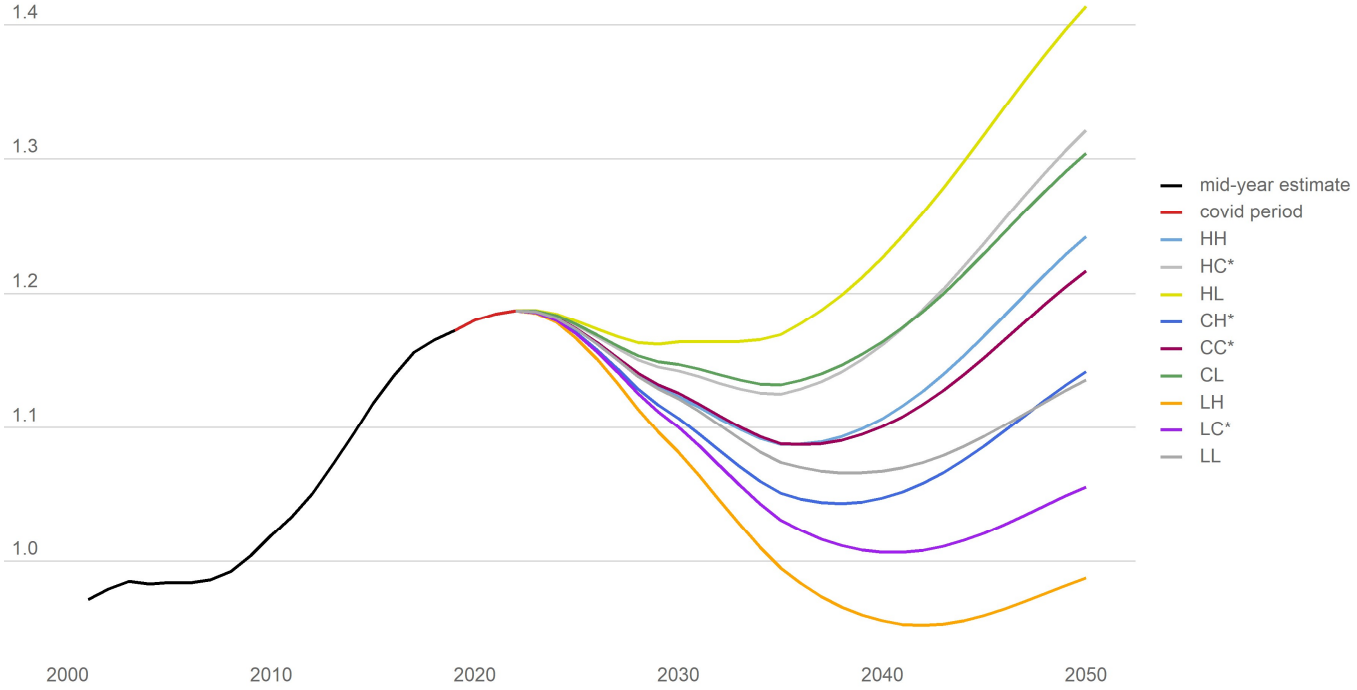
Persons aged 16-64 (millions)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography
* princial projection

School-age population, London

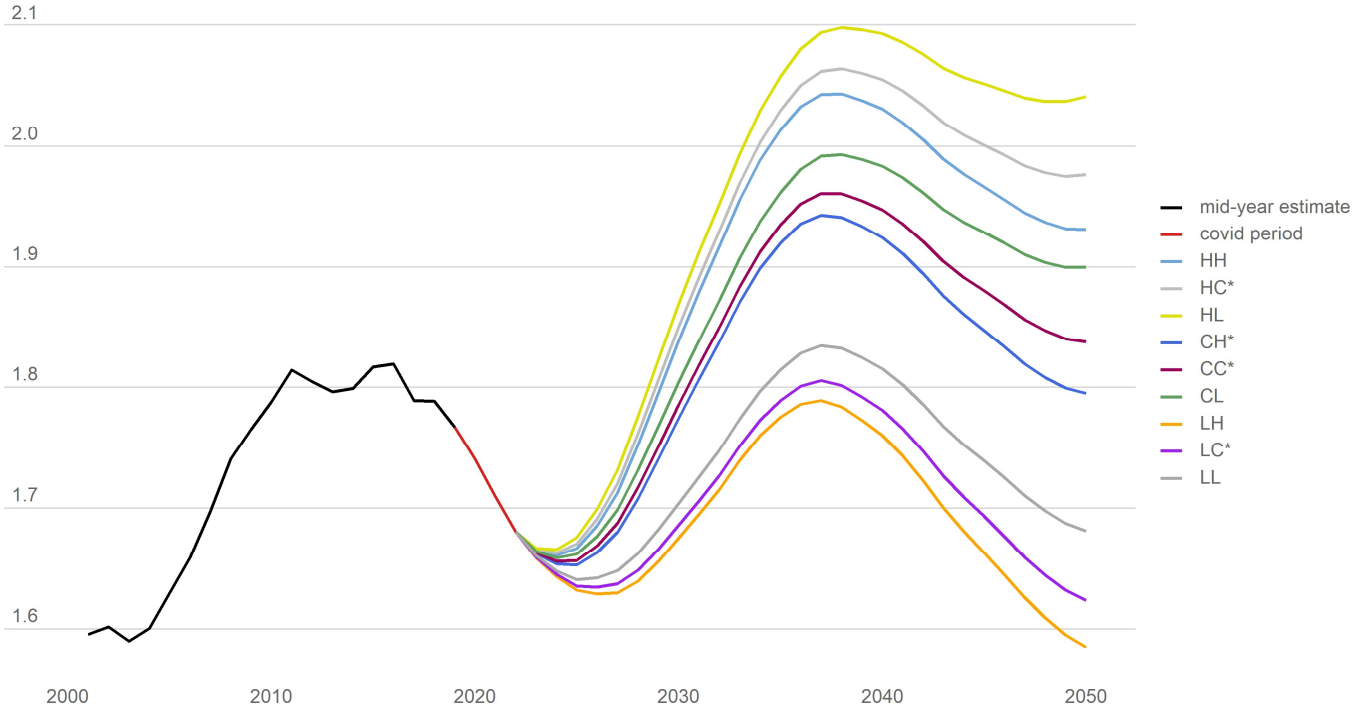
Persons aged 5-15 (millions)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography
* princial projection

Young adult population, London

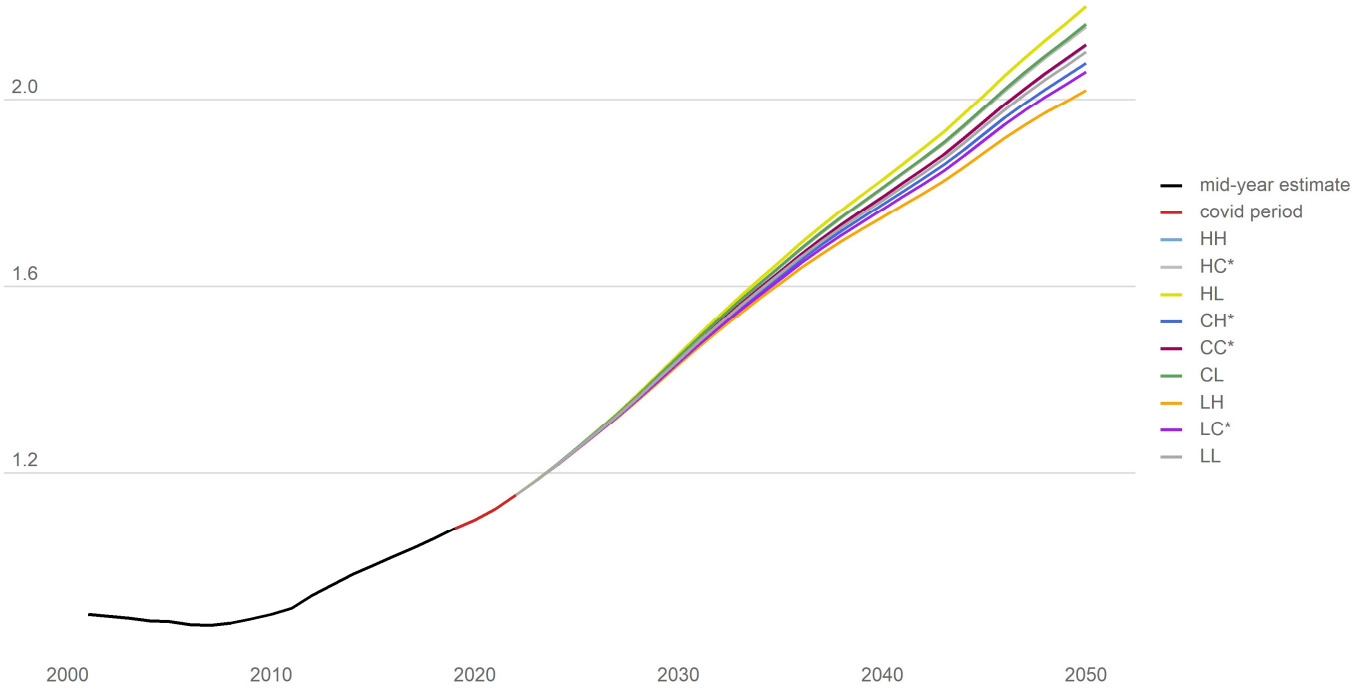
Persons aged 18-30 (millions)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography
* princial projection

Retirement-age population, London

Persons aged 65 and over (millions)



Source: ONS Mid-year estimates, GLA 2019-based projections; Chart: GLA demography
* princial projection

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