REAL Centre

Projections:

General and acute hospital beds in England (2018–2030)

July 2022

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Looking back

Supply and demand trends for beds

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An overview of past trends

The number of hospital beds has fallen significantly in England over the last 30 years – and yet the NHS has been able to deliver more care as a result of patients spending less time in hospital.

Over the past 30 years, the total number of available beds in England (overnight and day only) more than halved, falling under 150,000 beds in recent years. This was partly driven by certain services shifting outside hospital (eg for mental illness and long-term care), but also reflects changes in service delivery.

In what follows, we focus exclusively on beds used for general and acute care.

Despite the number of beds falling over this period, demand has risen and the NHS has been able to deliver more care. This was enabled by reductions in the time patients spend in hospital, ie through a fall in the average length of stay and a shift from overnight stays to day cases.

However, there are signs of rising pressures on the bed base in recent years. Bed occupancy has increased, rising to around 90% before the COVID-19 pandemic. This is higher than recommended levels and may be impacting hospital performance, for example against the A&E waiting times target.

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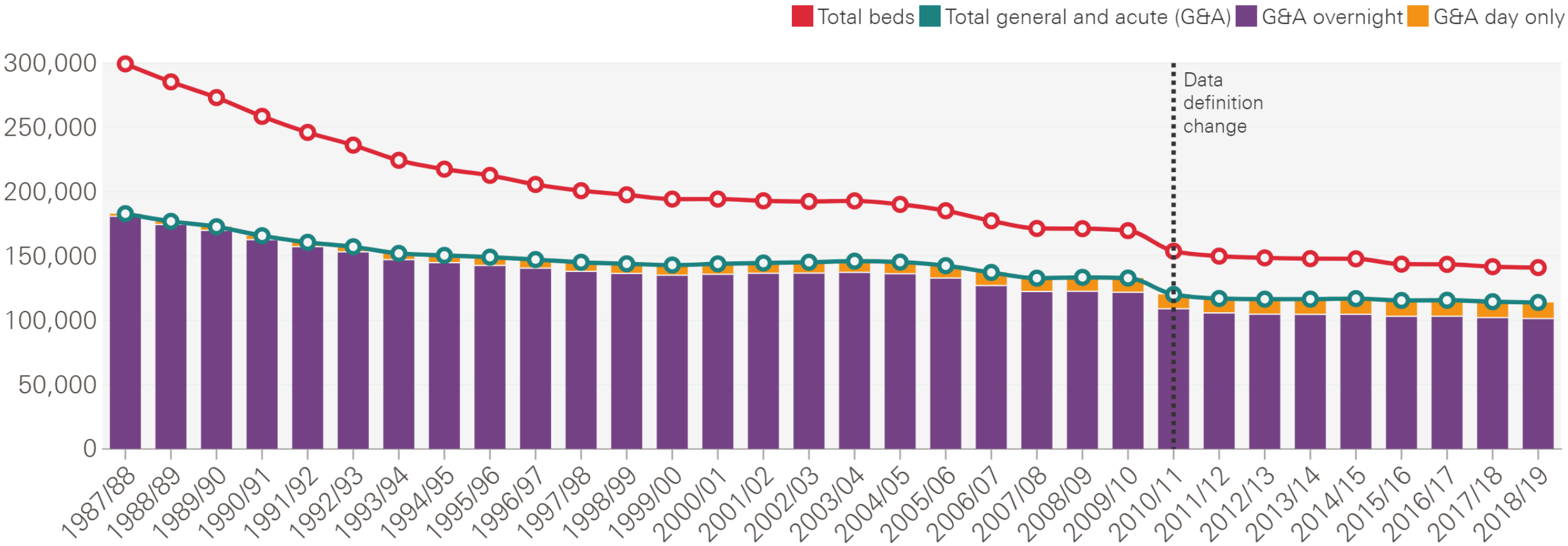
Note: We stop our data series in 2018/19, which is the latest full year before the pandemic. This is because of the shock to hospital capacity during the pandemic.

Trend in NHS hospital bed supply

Bed capacity has decreased substantially over the past 30 years

Available beds over time, 1987/88 to 2018/19



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Source: NHS England, Bed availability and occupancy dataset. • After 2010/11, beds managed by a nurse or GP are excluded; therefore the series is not directly comparable. Day only beds in G&A before 2010/11 are not reported; figure shows estimates based on the proportion of day only beds in G&A in 2018/19 (99%). Average daily number of beds over the year (before 2010/11) or quarterly average are reported.

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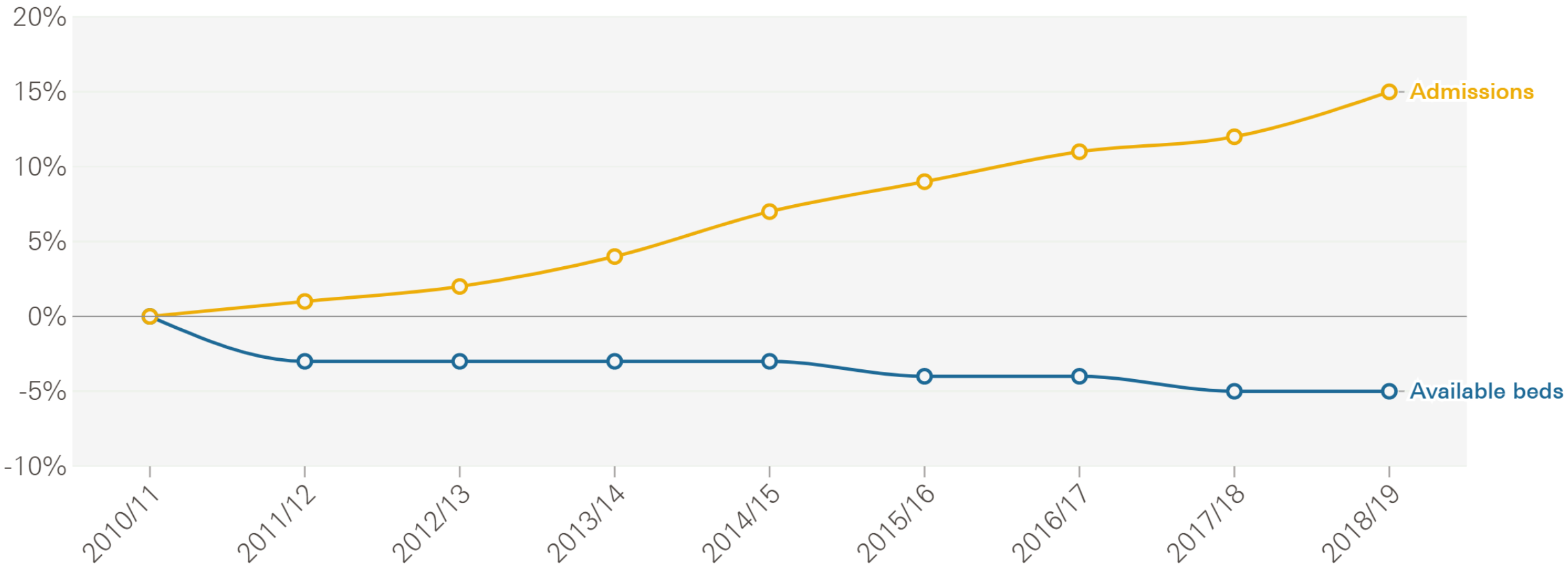
Hospital admissions and available beds

Beds have fallen by 5% since 2010/11, while admissions have risen by 15%

Hospital admissions and available beds, % growth over time, 2010/11 to 2018/19



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Source: NHS England, Bed Availability and Occupancy. NHS Digital data for admissions. • Available beds in general and acute care.

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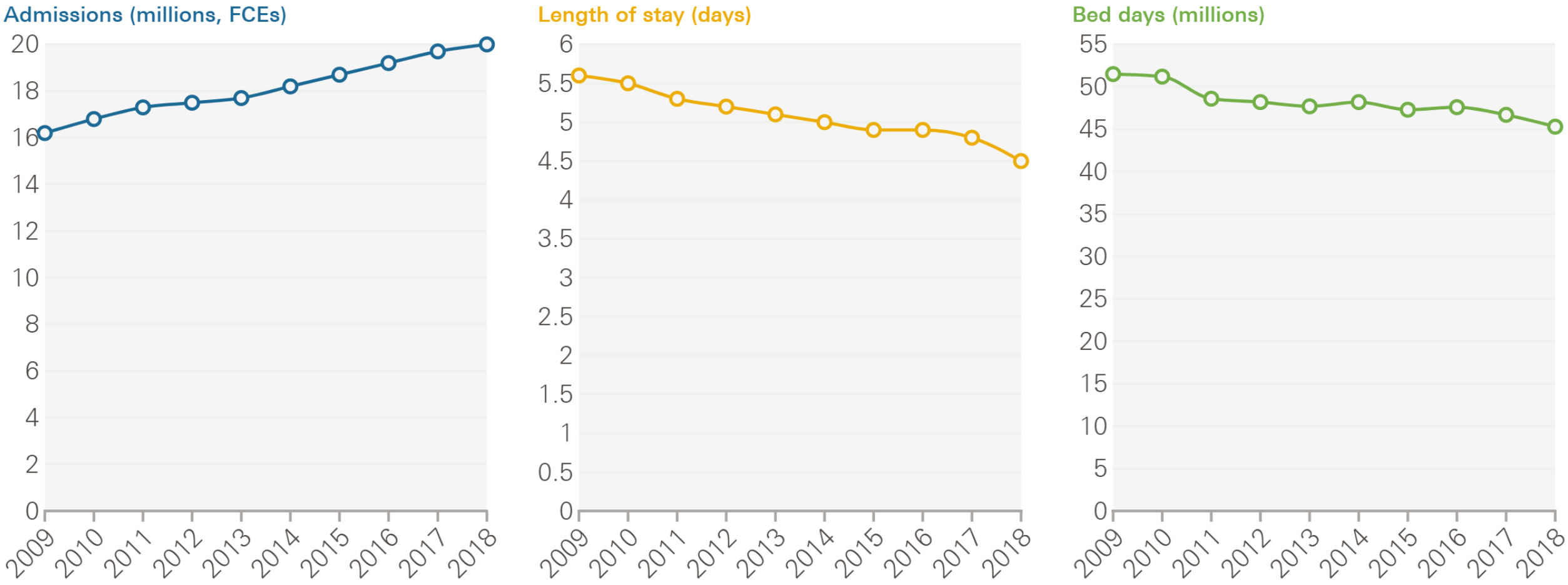
Admissions x Time in hospital = Hospital bed days

Fall in length of stay and shift to day cases has been enough to offset rise in activity



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Source: NHS Digital • FCEs (finished consultant episodes) constitute an episode of hospital care

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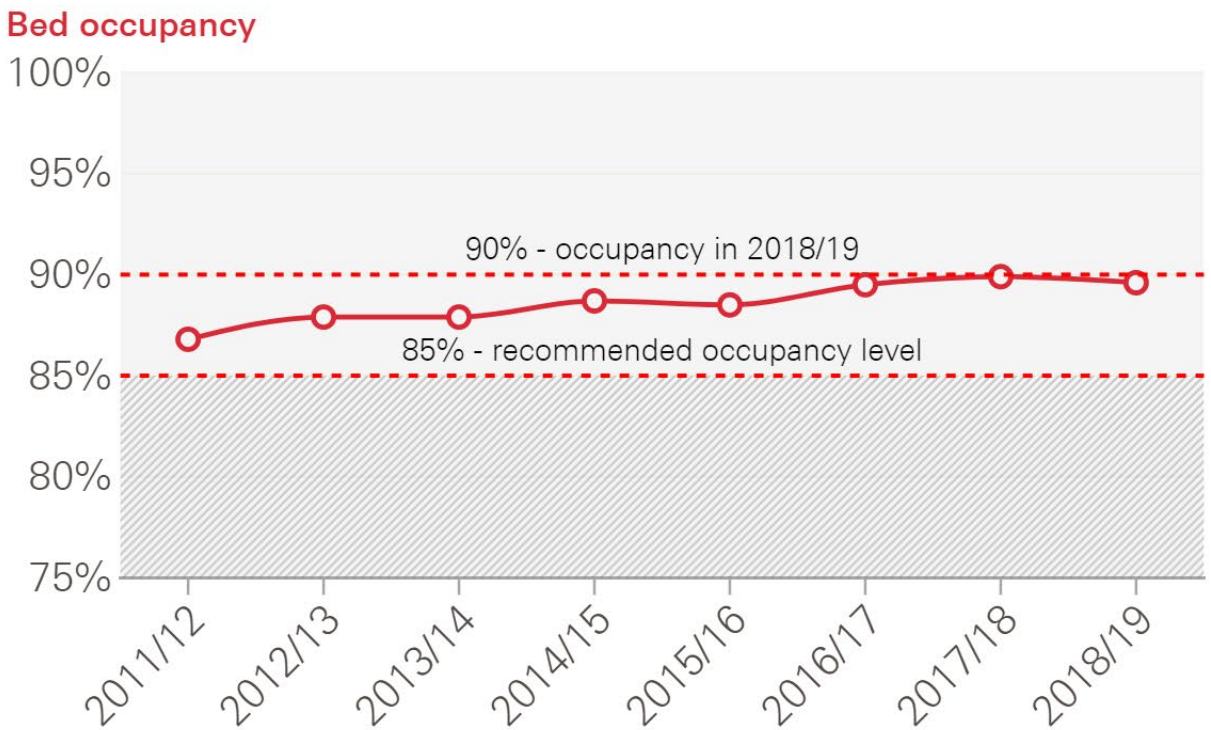
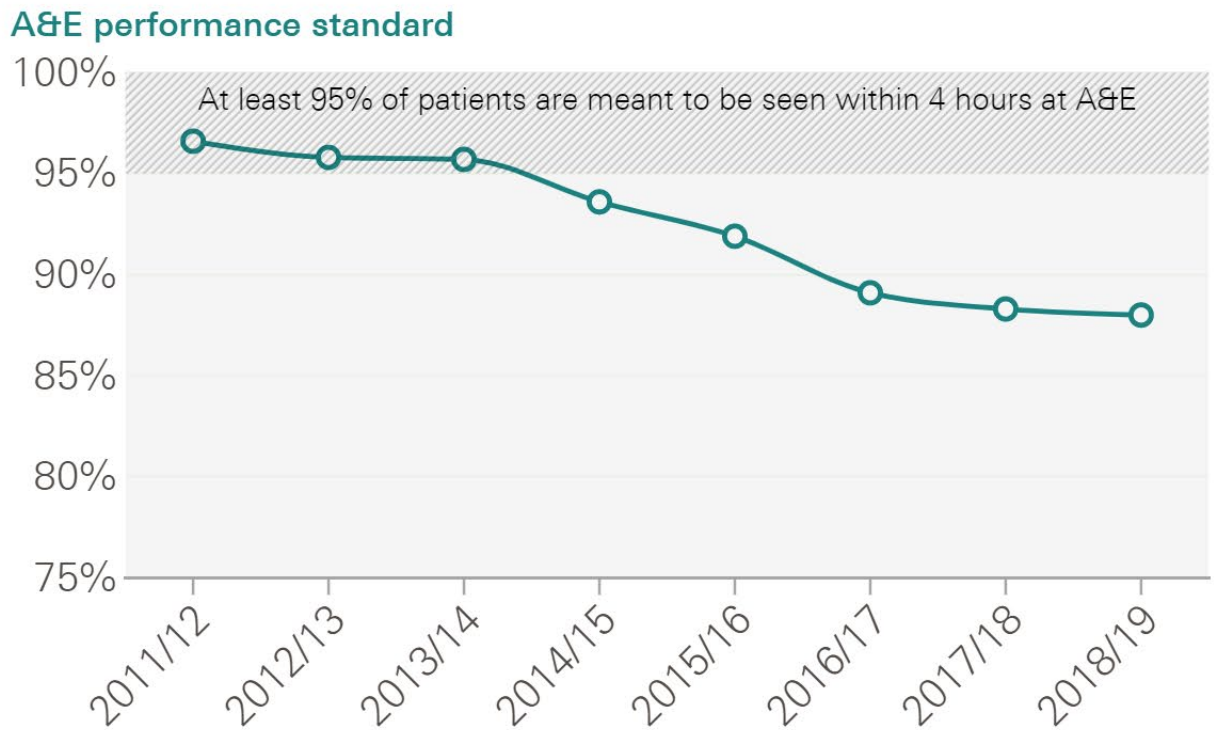
Bed occupancy and A&E performance

Bed occupancy has been rising over the last decade, potentially to unsafe levels. This has been associated with a fall in performance against the A&E waiting times target – the last time the target was met, bed occupancy averaged 87%

Trend, 2011/12 to 2018/19





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Source: NHS England, Bed Availability and Occupancy. • Yearly average for occupancy rates for overnight and day only general and acute care beds. Guidance from the National Audit Office recommends a 85% bed occupancy level while NICE recommends planning capacity to minimise the risk of exceeding 90% occupancy levels

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2 How does England compare?

International comparisons

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International comparisons

Internationally, England has fewer hospital beds per person than most other countries. The NHS in England also has a relatively low length of stay and high occupancy rate.

To understand how England compares, we draw upon data from the OECD. This shows that England has one of the lowest rates of hospital beds per person in the OECD, with just two beds per 1,000 people. This is a similar rate to both Canada and Sweden, but below the likes of France, Germany and Italy.

In order to treat high volumes of patients with so few beds, the NHS in England operates according to the principles of a 'lean' system. This means the NHS runs with little spare capacity, and has a short length of stay (one of the shortest in the OECD) and a high occupancy rate (one of the highest). Indeed, over the last decade, England has seen one of the fastest falls in the average length of stay across the OECD.

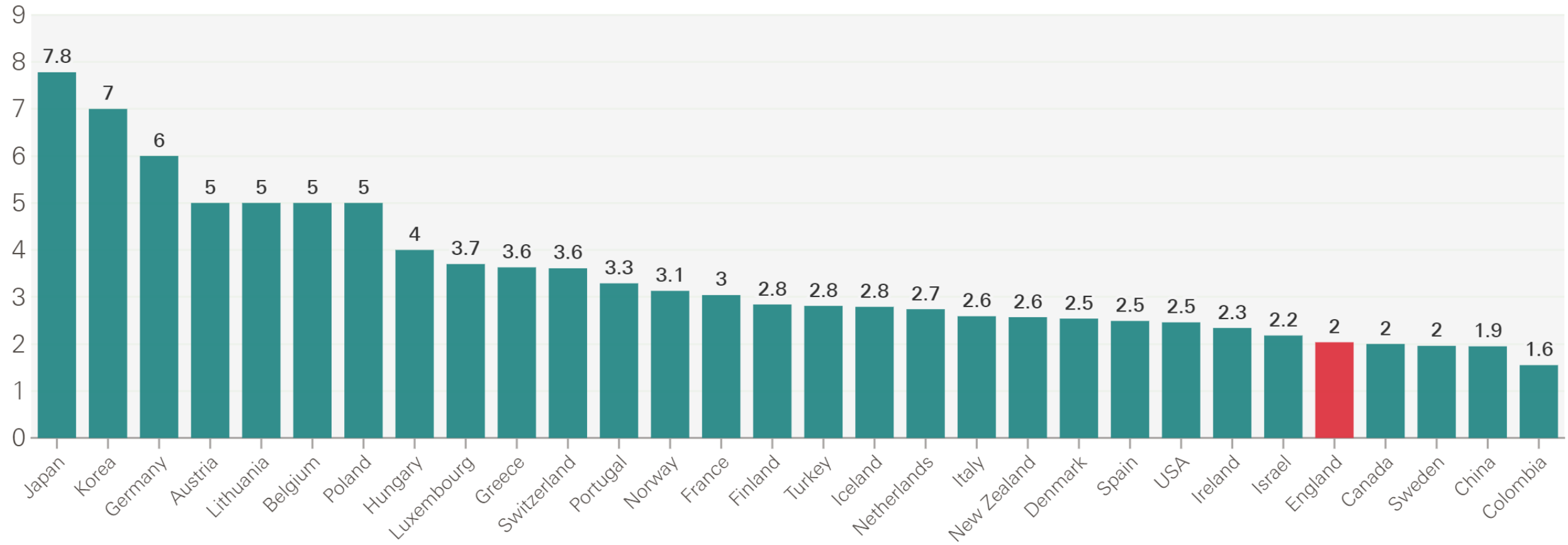
However, England's position as one of the countries with the fewest beds and shortest lengths of stay raises the possibility that future gains may be harder to achieve.

Despite its relatively low staff density, the UK's ratio of staff-to-beds is also the highest in the OECD. It is difficult to say what the optimal rate would be, but this raises the prospect that some increase in the number of beds could be realised within current staffing levels.

Acute hospital beds in OECD countries

Pre-pandemic, bed capacity in England was lower than many international comparators

Acute hospital beds per 1,000 of population (2018)



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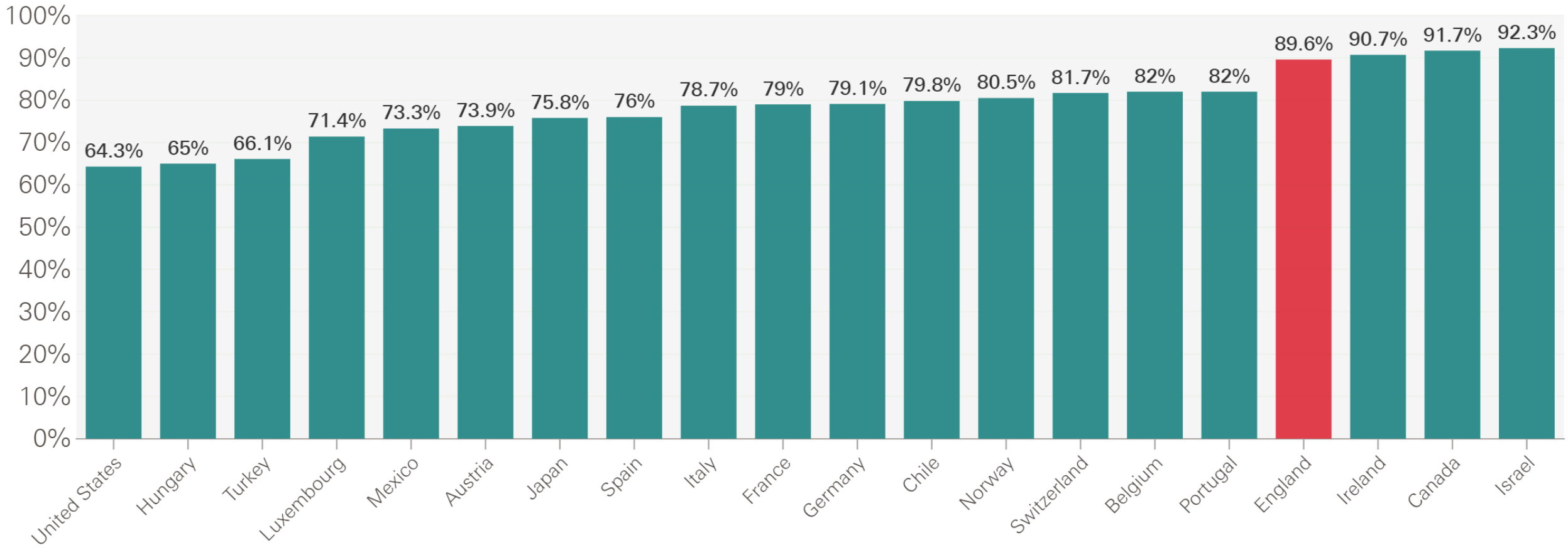
Source: OECD (2021), Hospital beds (indicator). doi: 10.1787/0191328e-en (Accessed on 21 October 2021). • Figure for England is estimated using NHS England data and ONS population. There is no data available for the UK.

REAL Centre Projections: G&A hospital beds in England (2018–2030)

Acute hospital bed occupancy in OECD countries

Acute bed occupancy level in England was also higher than most OECD countries

Bed occupancy rate (2018)



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Source: OECD dataset • Figure for England is estimated from NHS data for overnight and day only general and acute care beds.

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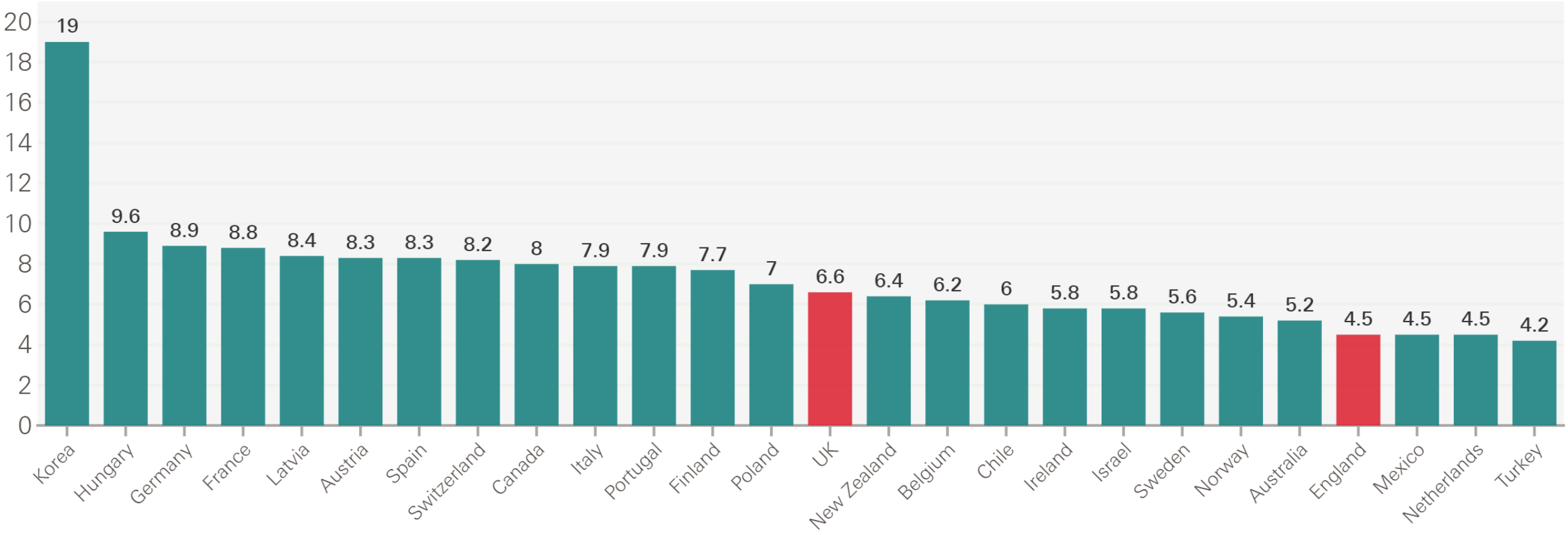
Average length of stay in OECD countries

Length of stay in England was almost the shortest reported among OECD countries

Length of stay, all causes, days (2018)



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Source: OECD stats, Data for England is taken from NHS Digital's Hospital Admitted Patient Activity files.

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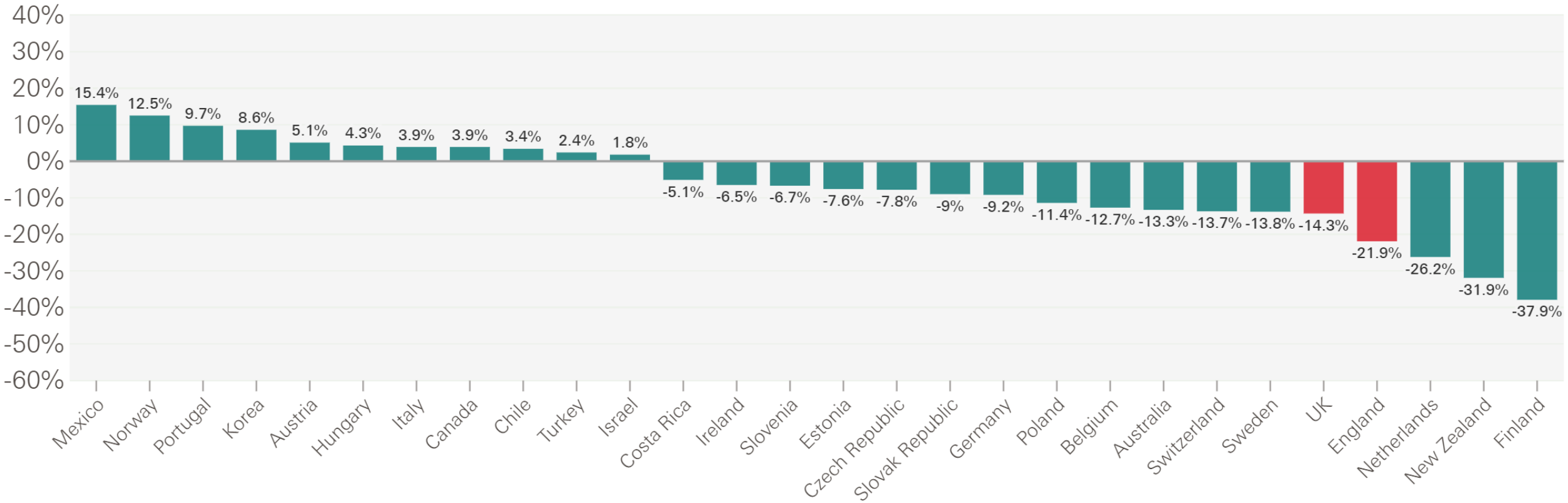
Change in length of stay in OECD countries

Average length of stay in England fell by around 22% over 10 years, equivalent to one day; this was one of the fastest falls across the OECD

% change in average length of stay, 2008–2018



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Source: OECD stats • We exclude France and Spain as a data break in 2016 results in an artificial jump in the value for length of stay..

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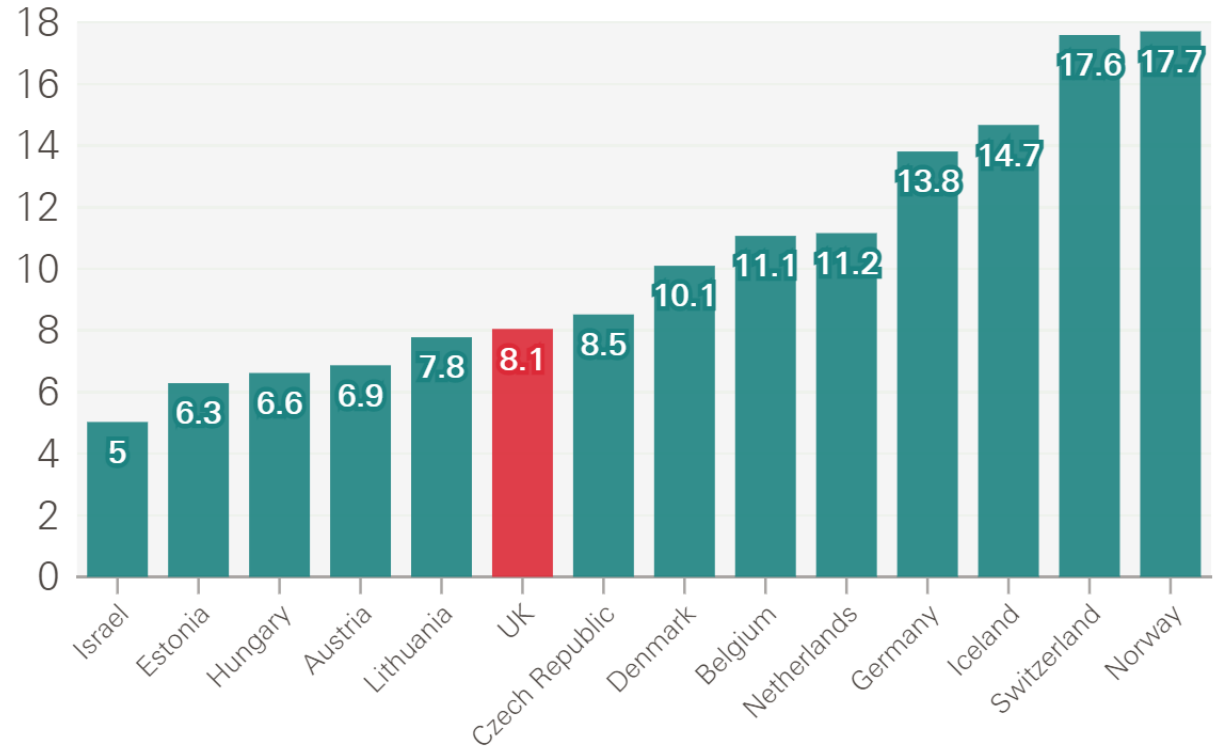
Hospital bed-to-nurse ratio

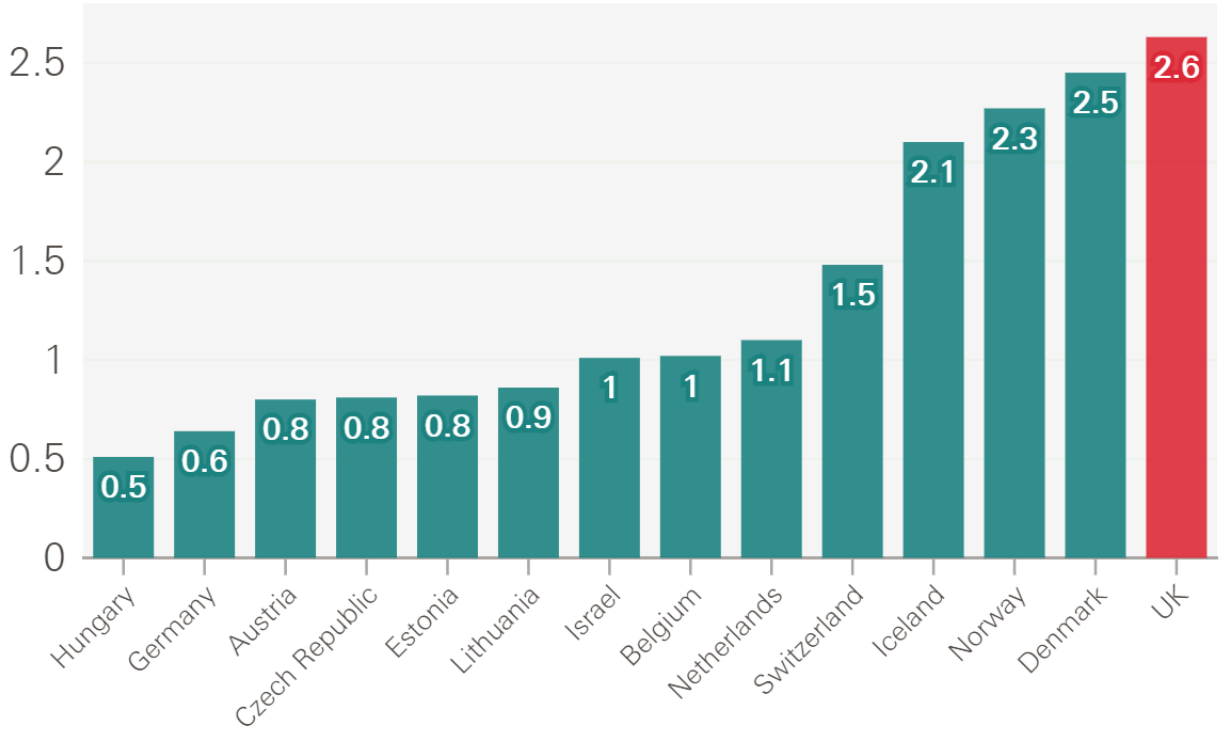
Despite a low rate of nurses per head of population, the UK has the highest ratio of nurses to beds in the OECD

(2018)

Practising nurses per 1,000



Nurse-to-bed ratio (FTE)



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OECD stats

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3 REAL Centre activity projections

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REAL Centre activity projections

To keep up with demand pressures, the REAL Centre projects a marked increase in activity is needed over the next decade.

The REAL Centre projects the NHS hospital activity needed over the next decade to keep up with demand. To do this, we establish the rate of care per person (by age, gender, mortality and morbidity) at a baseline year (2018/19) and then project changes in the population through to 2030/31.

In our model, we account for the following factors:

- population size
- population ageing
- mortality rates
- changes in morbidity.

Each is projected to rise in the coming decade, which corresponds to upward pressure on demand.

For more on our demand projections, see REAL Centre Funding Projections 2021.

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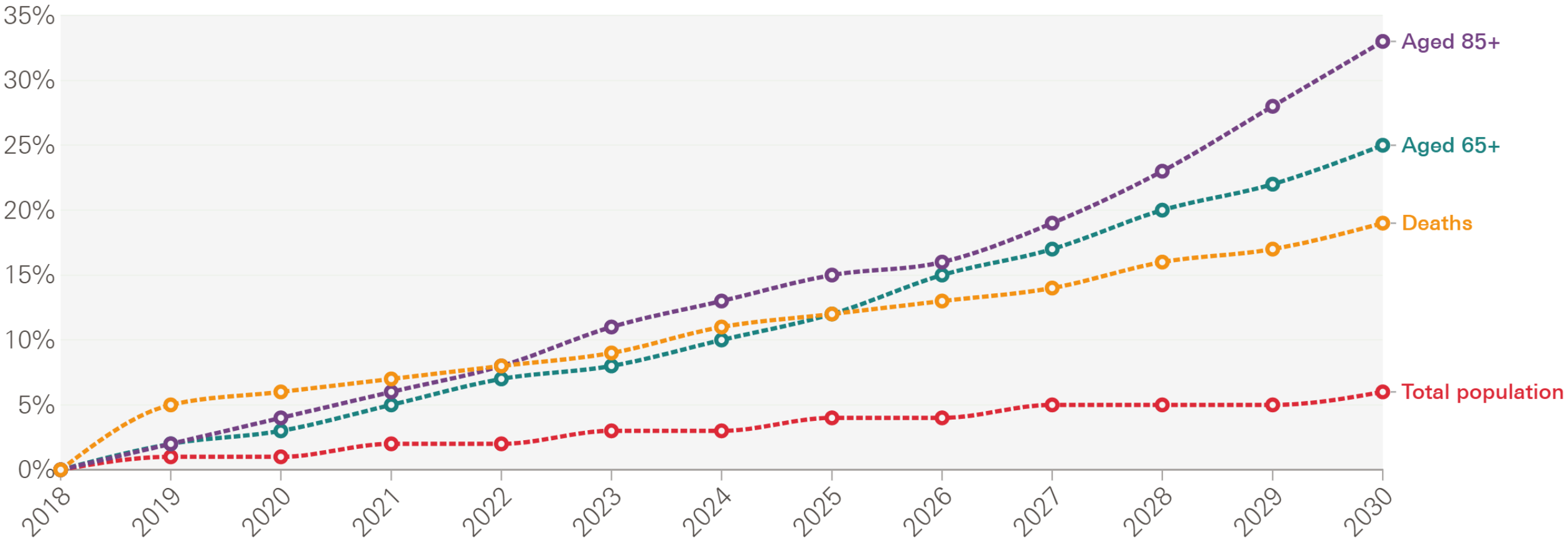
Projected population trends to 2030

By 2030, the population will be larger, older and there will be more deaths each year

% growth relative to 2018



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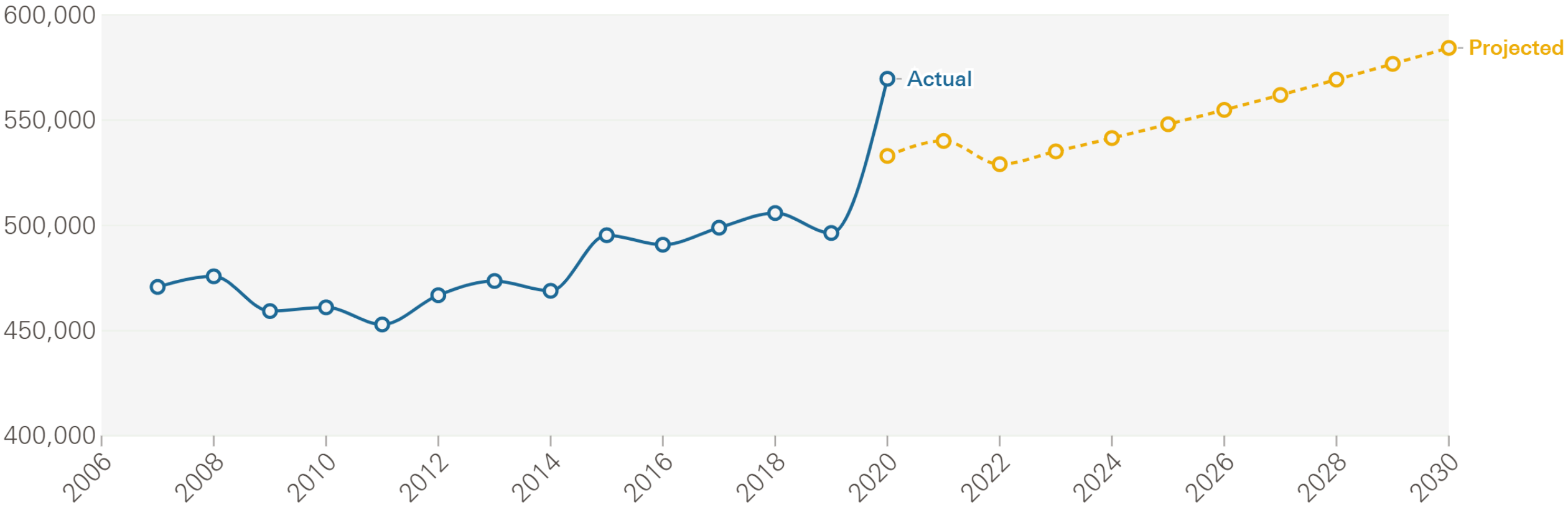
Source: 2018-based ONS population projections.

Historical and projected deaths in England

The number of deaths per year is projected to increase over the next decade, putting pressure on health care

Annual deaths, 2007–2030



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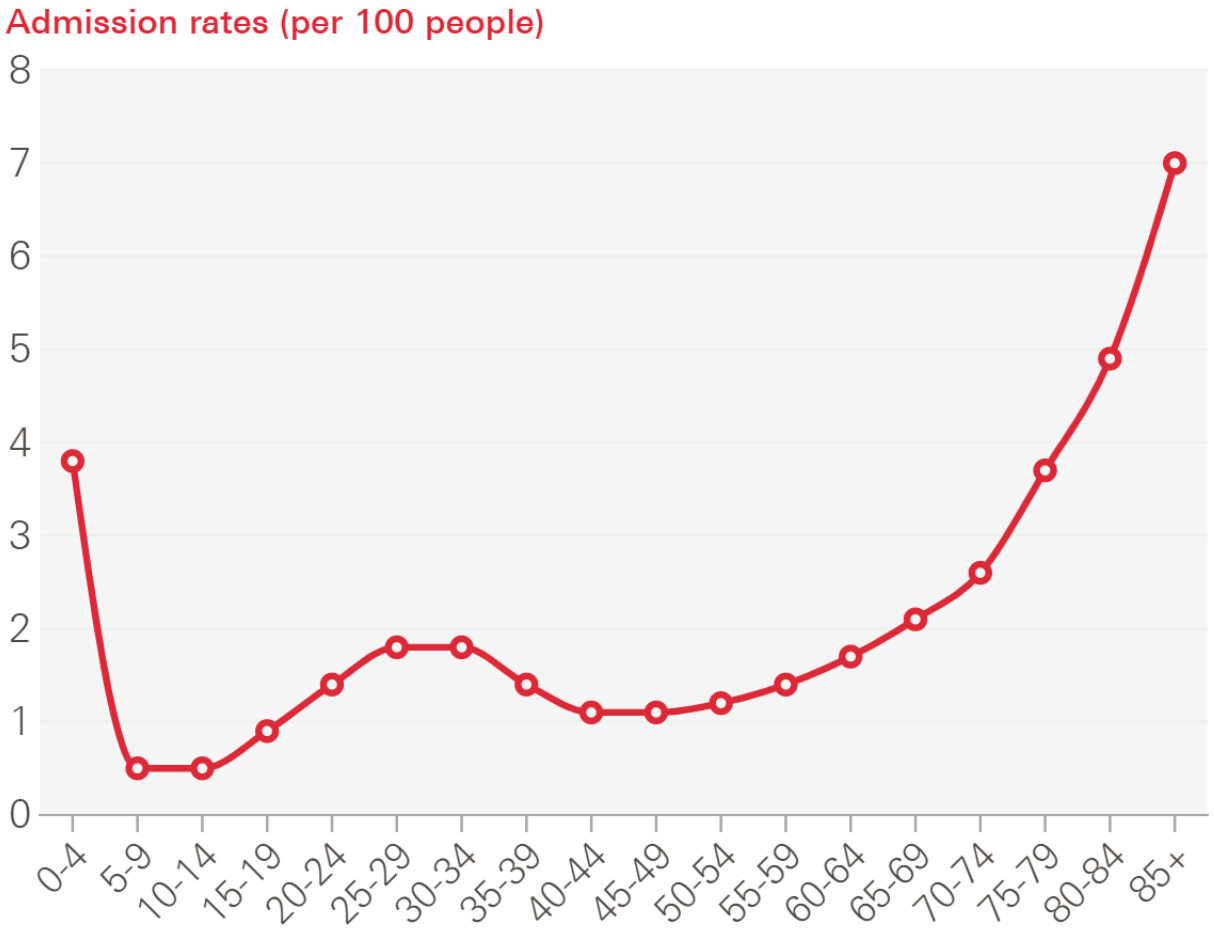
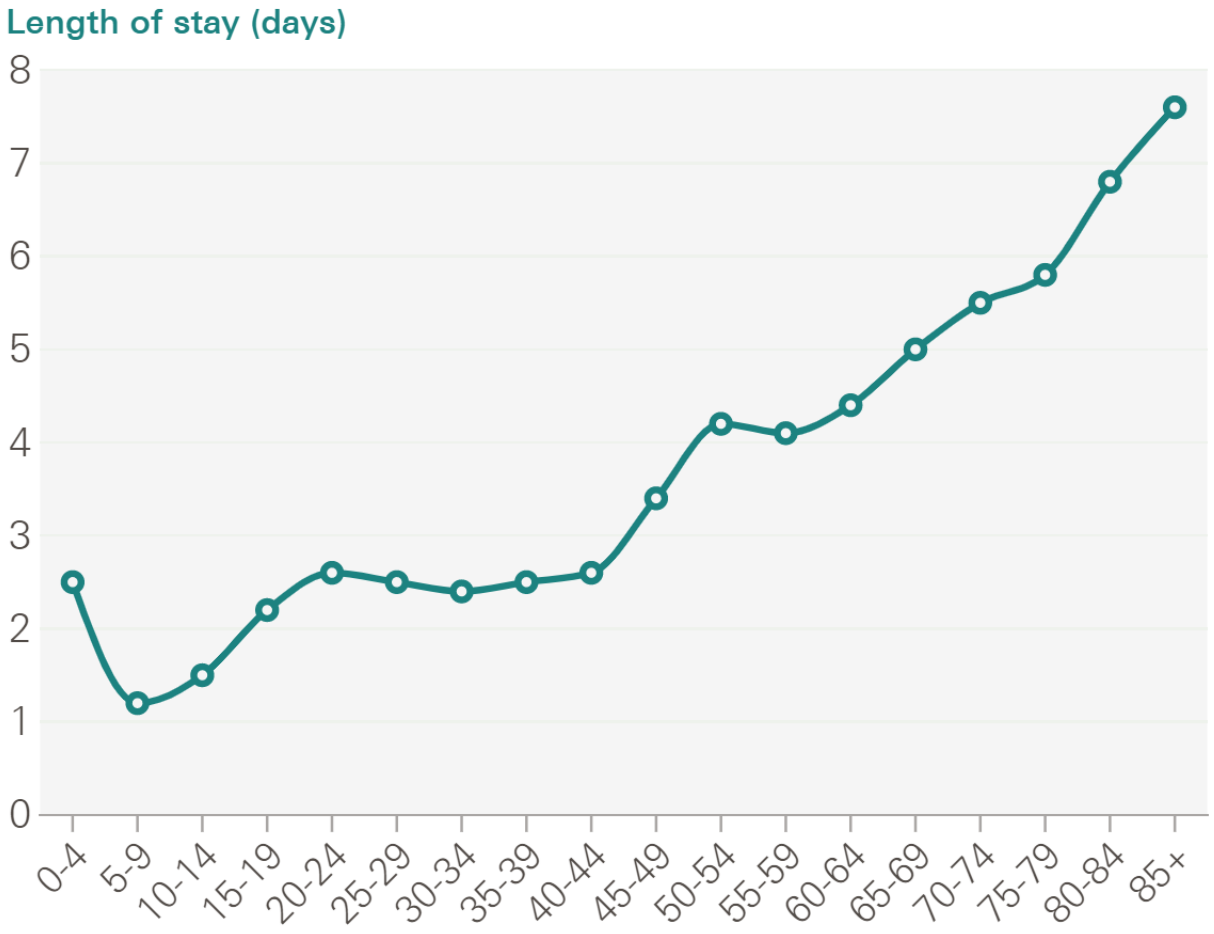
Source: Actual deaths from the ONS, and projections from the ONS 2020 population projections.

REAL Centre Projections: G&A hospital beds in England (2018–2030)

Hospital admission rates and length of stay by age

Hospital admission rates and length of stay are both higher for older age groups





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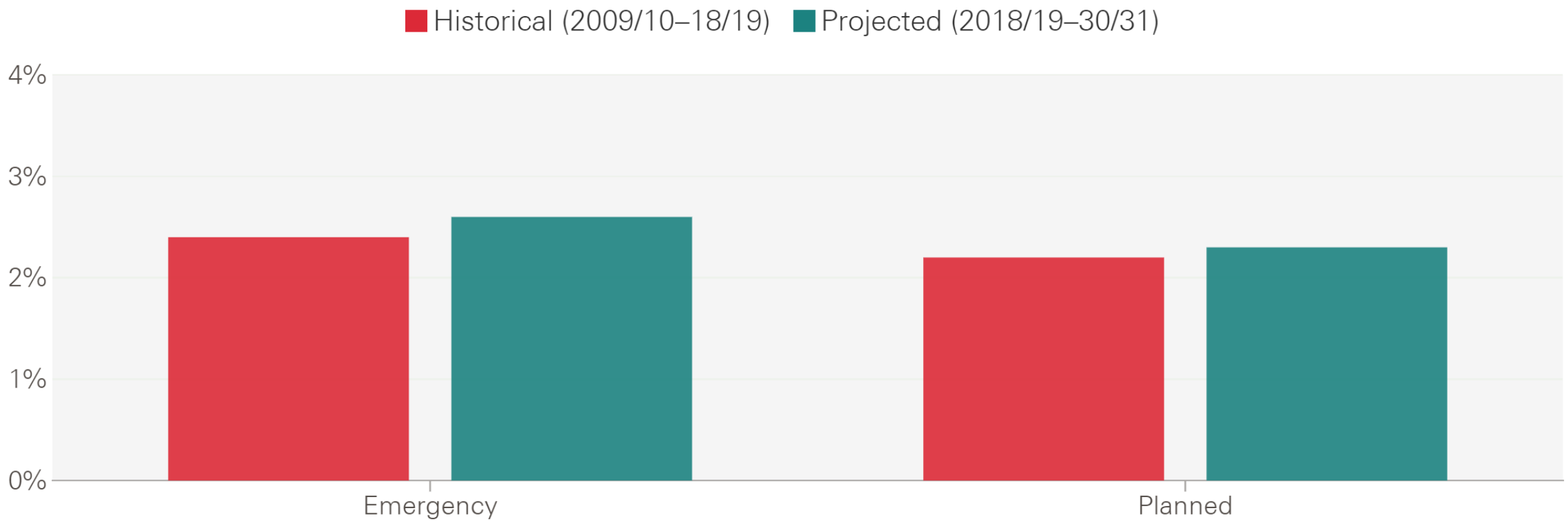
Source: REAL Centre's calculation based on HES data (2018/19) • Hospital admission rates for planned (excluding day cases) and emergency admissions.

REAL Centre Projections: G&A hospital beds in England (2018–2030)

Projected trends in hospital admissions

As a result of pressures from demographics and morbidity, our projections suggest admissions would have to grow faster than (emergency) or close to (planned) their historical average

Annual growth (%)



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Source: REAL Centre's calculations based on HES data.

4 REAL Centre beds projections

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REAL Centre G&A beds projections

We model different scenarios for the number of general and acute hospital beds required to keep up with demand, based on delivering 2018/19 rates of care to the population in 2030/31. Under our central scenarios, supply would need to grow by 23,000–39,000 beds by 2030/31.

We estimate the number of hospital beds required to deliver 2018/19 rates of care to the population in 2030/31 (section 3). We project the associated rise in bed days and, holding the bed occupancy rate constant, the number of beds required to keep up with demand.

Without further changes in care, a significant increase in the number of general and acute beds would be needed. However, in recent years the time spent in hospital has fallen significantly (section 1), moderating these pressures. To reflect this, we model different scenarios for time spent in hospital, with changes in:

1. Average length of stay (ALoS)
2. Proportion of planned admissions delivered as day cases

Under our central scenarios these fall and rise, respectively, but at a slower rate than observed in recent years. This reflects the principle of diminishing returns, by which earlier gains are the 'low-hanging fruit' and further gains are harder to achieve – as noted, England already has one of the shortest lengths of stay in the OECD (section 2). In all our scenarios, we hold bed occupancy constant at 87%.

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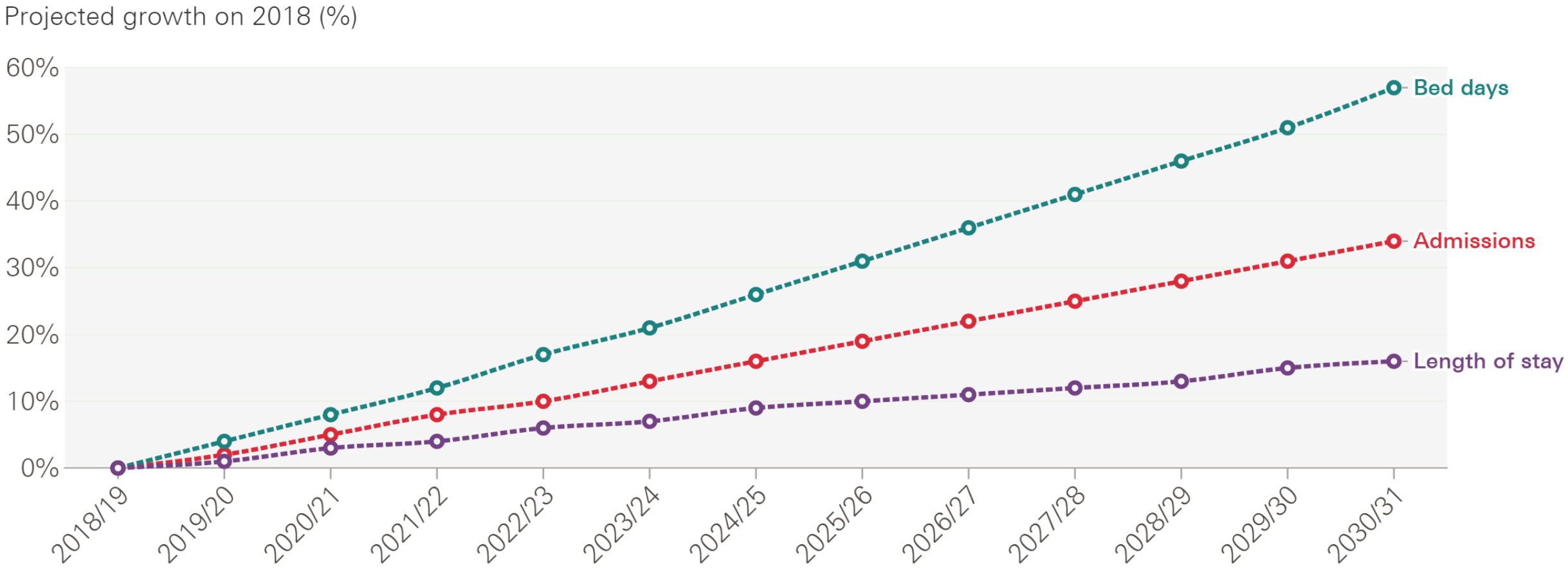
Projected growth in hospital activity

Without any further changes in care delivery, our projections imply significant pressures on length of stay – as composition of patients becomes more complex – and hospital bed days



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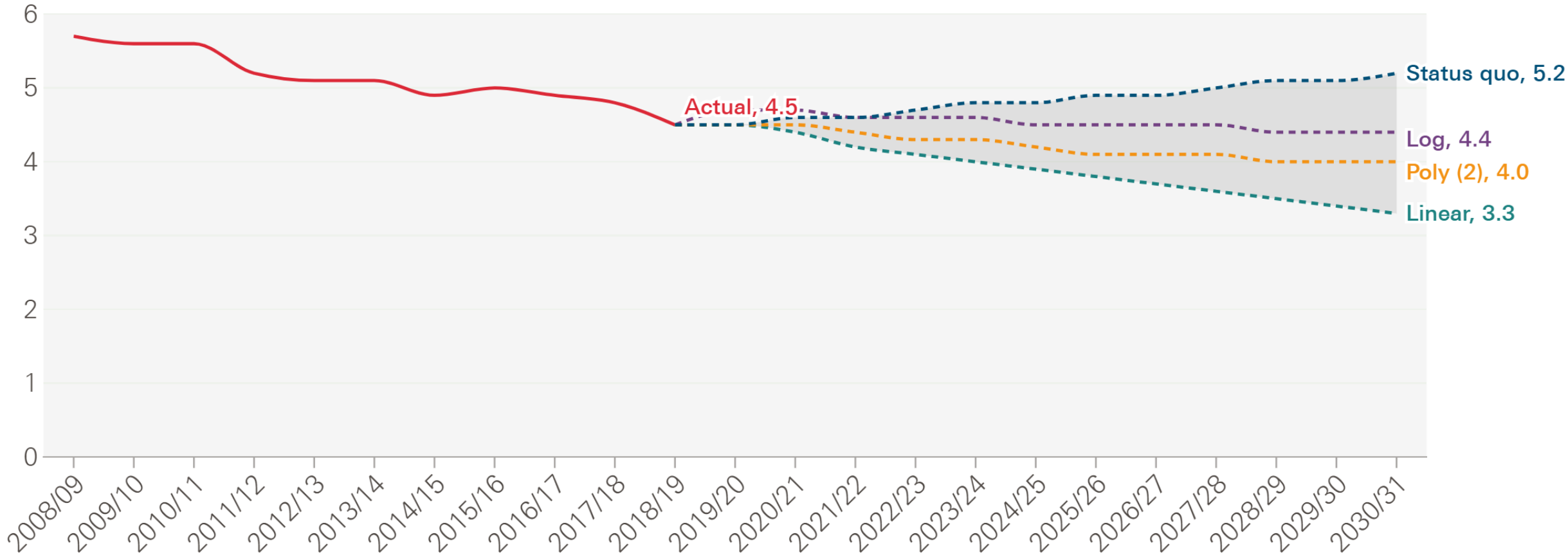
Source: REAL Centre's calculations based on HES data.

REAL Centre Projections: G&A hospital beds in England (2018–2030)

Projected length of stay (days) to 2030

REAL Centre projections of average length of stay based on different model fits

Projected length of stay, by modelling assumptions



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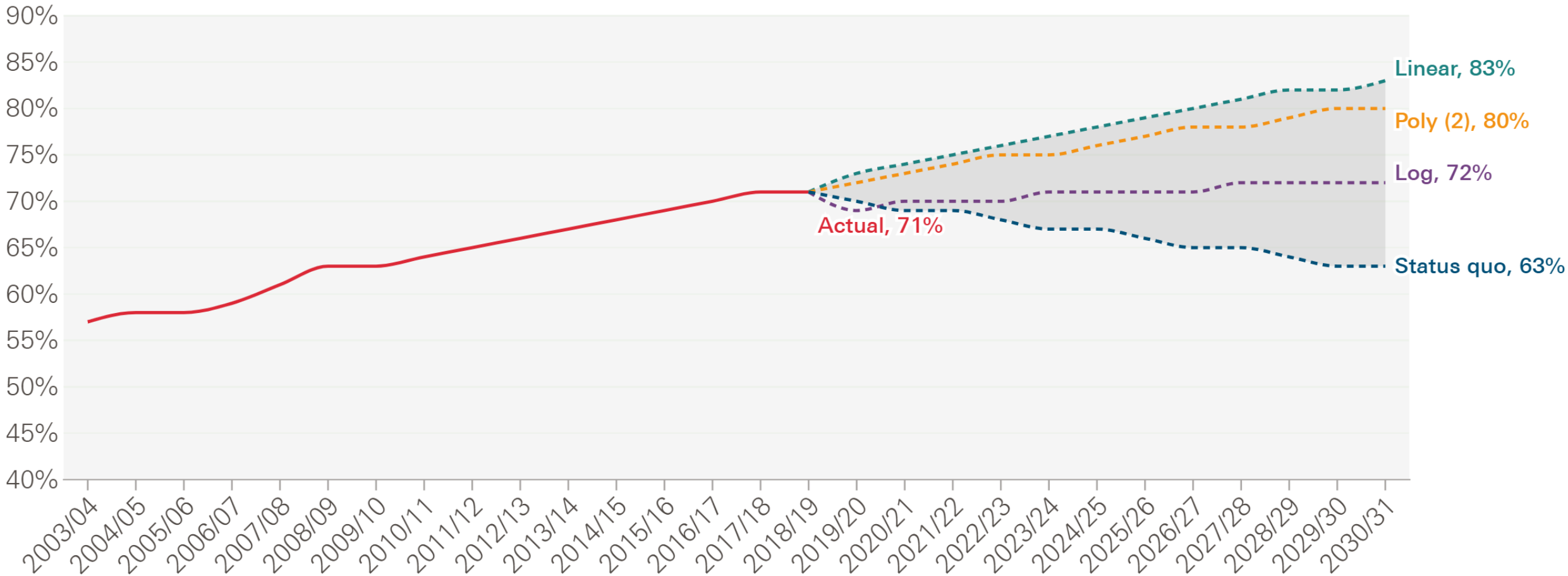
Source: REAL Centre calculations based on HES data. • Length of stay is calculated for an hospital spell, which may include more than one episode of care but does not include transfers to another hospital.

Projected day cases (%) to 2030

REAL Centre projection of proportion of planned care delivered as day cases under different model fits

Projected proportion of planned care delivered as day cases, by modelling assumptions



Source: REAL Centre calculations based on HES data. • Status quo corresponds to the proportion of day case resulting from our projected future planned and non-planned (emergency) activity. Poly (2) is polynomial of order 2, and log is the logarithmic trend. Note: Planned activity includes regular attendances; REAL Centre numbers are modelled estimates and may differ to actual data from NHS Digital.

REAL Centre projections: scenarios for time in hospital

	Upper pressure	Slow fall in time in hospital	Fast fall in time in hospital	Lower pressure
Length of stay	No change in length of stay by age, gender and morbidity (LoS rises as a result of change in patient composition)	Slow fall in LoS (log trend) – emergency falls 0.3% per year and planned care 0.2% per year	Fast fall in LoS (poly trend) – both emergency and planned care falls 1.0% per year	Fastest fall in LoS (linear trend) – both emergency and planned care falls 2.6% a year
Day case	No change in proportion of planned care delivered as day cases – proportion falls as a result of faster growth in demand for long stays	Slow increase in day case proportion (log trend) – share of planned care as day cases grows 0.2% per year	Fast increase in day case proportion (poly trend) – share of planned care as day cases grows 1.0% per year	Fastest increase in day case proportion (linear trend) – share of planned care as day cases grows 1.4% per year

Explainer – Our central scenarios ('Slow fall' and 'Fast fall') see the time patients spend in hospital falling, but not as rapidly as in the last decade. Why do we think progress will slow?

1) We assume there are diminishing returns; that is, it gets harder to make improvements over time since the easiest changes to make – the 'low-hanging fruit' – have already been made

2) Another, similar reason is that England already has one of the shortest lengths of stay in the OECD

3) Finally, we anticipate more aggressive impacts of ageing and death that will put upward pressure on time in hospital

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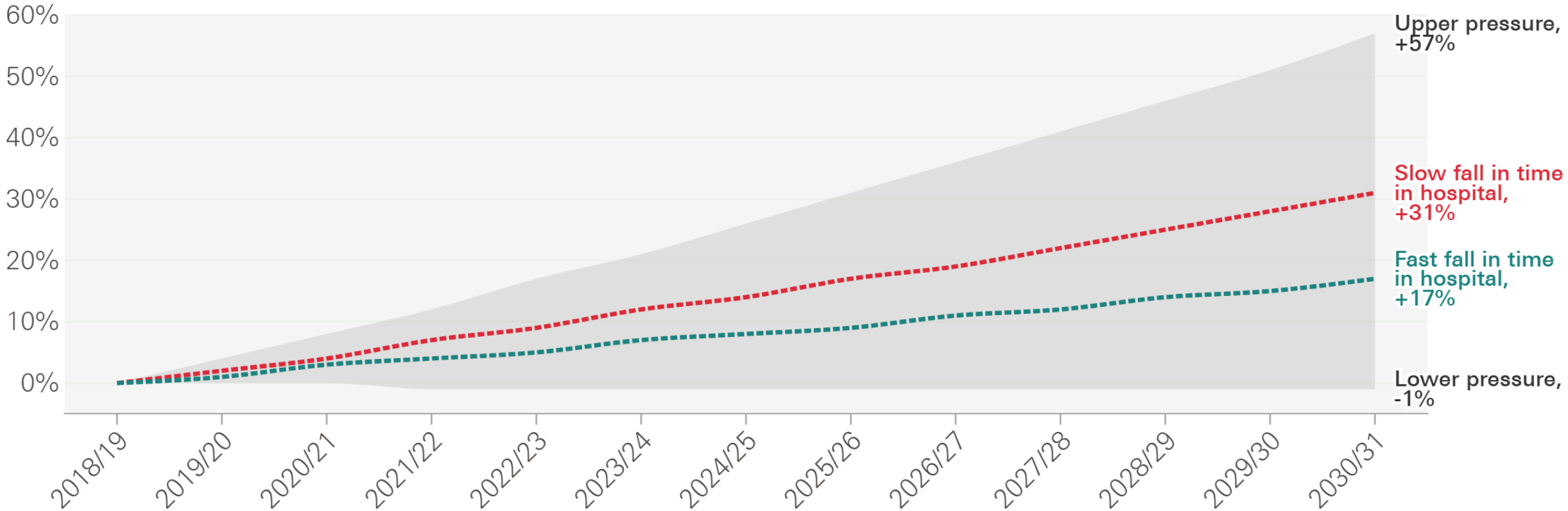
Projected bed days growth by scenario

REAL Centre projections for general and acute hospital bed days vary widely depending on assumptions on time spent in hospital

General and acute hospital bed days, % change on 2018/19



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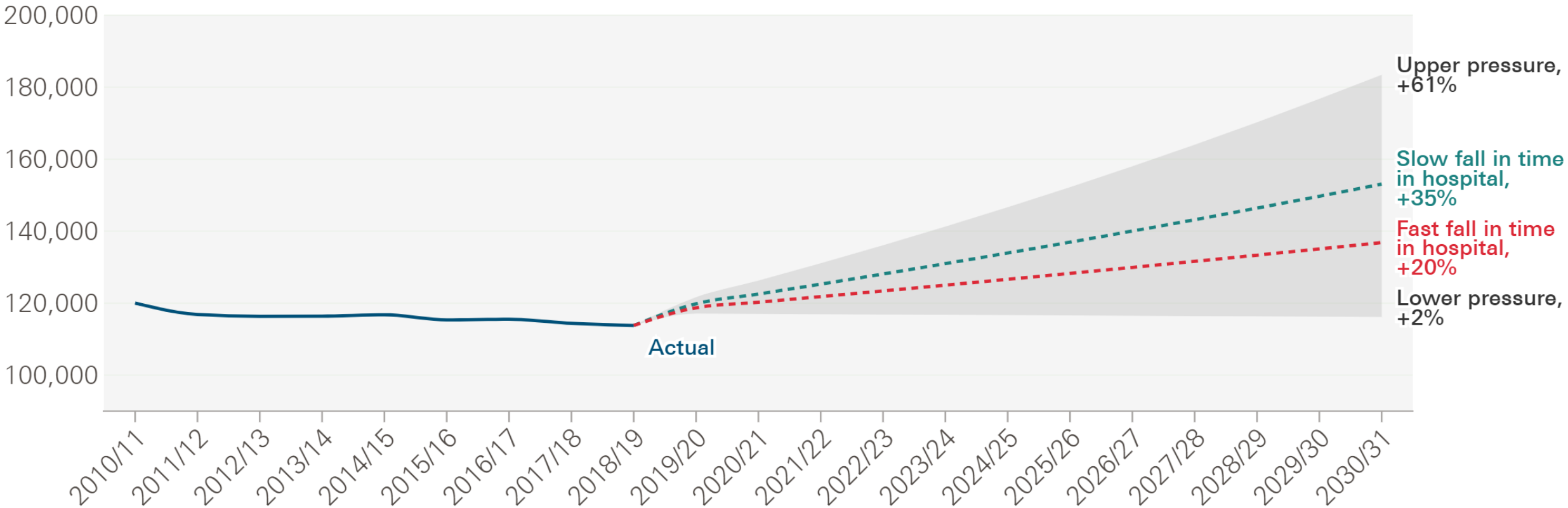
Source: REAL Centre's calculations based on HES data.

REAL Centre Projections: G&A hospital beds in England (2018–2030)

Actual and projected G&A bed supply

The projected increase in the number of general and acute hospital beds needed would be a break with the trend for flat or declining bed supply

General and acute beds, actual and projected



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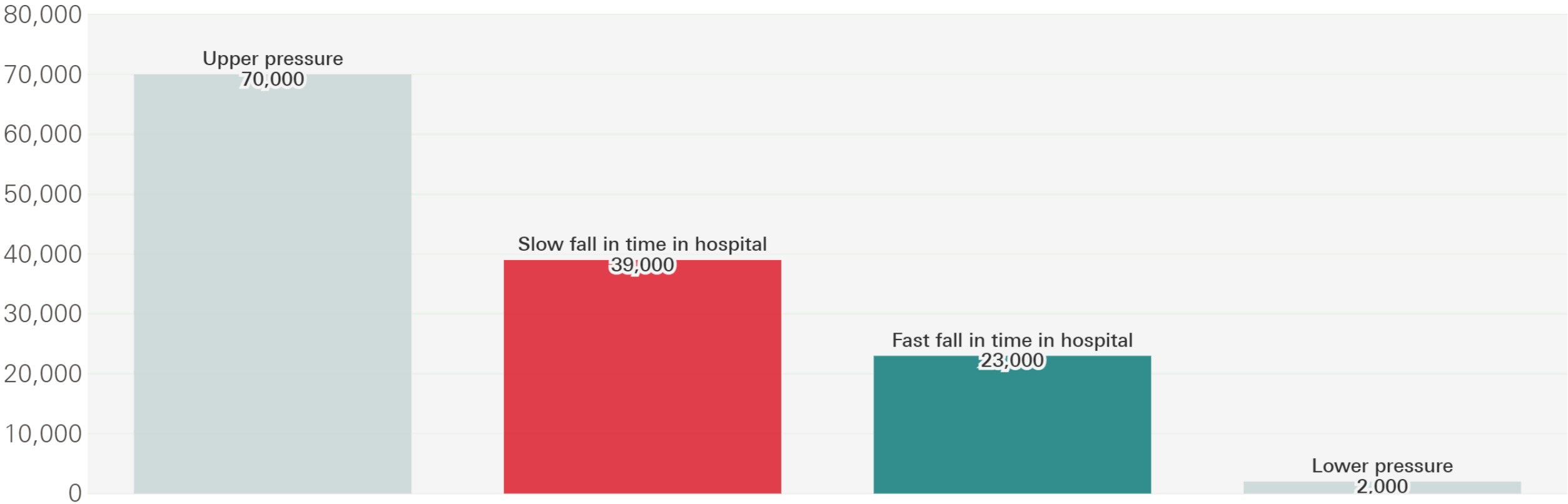
Source: REAL Centre's calculations based on HES data, NHS England data for historical beds. • When projecting the number of beds we hold bed occupancy constant at 87% - this is the annual average rate the last time the A&E 4-hour target was met.

REAL Centre Projections: G&A hospital beds in England (2018–2030)

Projected extra G&A beds by 2030/31

To keep up with demand, REAL Centre projections show the number of general and acute hospital beds would need to increase by 23,000–39,000 under our central scenarios

Extra general and acute beds, relative to 2018/19



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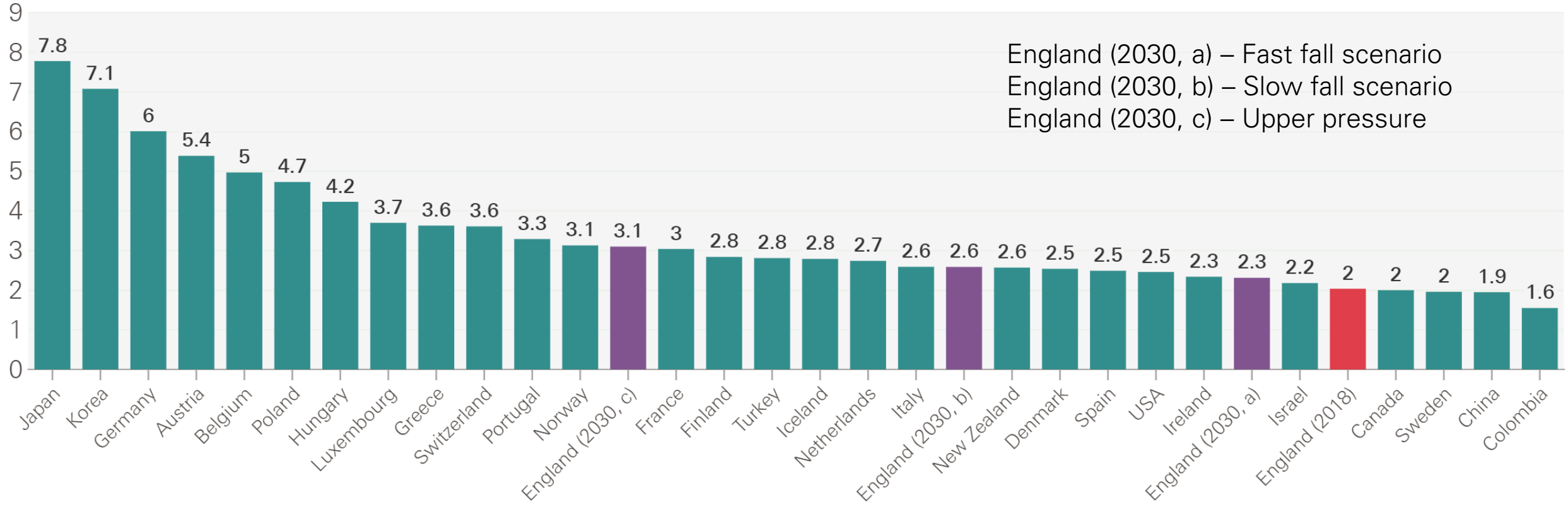
Source: REAL Centre's calculations based on HES data. • All values are rounded to the nearest thousand

REAL Centre Projections: G&A hospital beds in England (2018–2030)

Acute hospital beds: actual (2018) and projected (2030)

Even in the high estimate, ie no further improvements in length of stay and day case, England would be at 3.1 beds per 1,000 inhabitants, around the same level as France currently.

Acute hospital beds per 1,000 of population



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Source: OECD (2021), Hospital beds (indicator), England figures are estimated using NHS England data and ONS population.

REAL Centre Projections: G&A hospital beds in England (2018–2030)

REAL Centre G&A beds projections

Under our central scenarios, we project there will need to be a significant increase in hospital beds if 2018/19 levels of care are to be maintained, following decades of decline. Why is this?

The central scenarios of the REAL Centre projections represent a stark deviation from the recent past (section 1) in which the number of general and acute hospital beds fell. The following assumptions underpin our modelling, and explain this break:

- First, our projected growth in admissions is higher than historic trends due to population ageing and rising complexity (owing to higher morbidity and an increase in the number of deaths).
- Second, we project a slower fall in the time patients spend in hospital (slide 27). This is because we expect diminishing returns from efforts to reduce this, in part because England already has a short length of stay.
- Finally, we don't allow for any further increase in bed occupancy, which had risen to unsafe levels. Instead, we hold bed occupancy at 87%, the rate at which the A&E 4-hour target was last met (slide 8).

Our projections imply the NHS has several options available. It can target much faster falls in time in hospital (although this may be unrealistic); it can reduce demand or divert hospital admissions; or it can increase the supply of beds. Increased bed supply may also improve the resilience of the NHS as a system.

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5 Costing the increase in beds

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Costing the increase in beds

We provide indicative costings for the increase in hospital beds, under which we find £17-29 billion would be needed under our central scenarios for the DHSC capital budget.

Under our central scenarios, an additional 23,000–39,000 beds would be needed to meet demand in 2030/31, equivalent to around 160–270 additional beds for each acute trust in England*.

Alternatively, based on the average size of a hospital in England, this equates to 38–64 new hospitals. We estimate the cost of a new hospital based on the first phase of the Health Infrastructure Plan, according to which £2.7bn would deliver six major hospital rebuilds (~£450m each). This corresponds to a cost of £17bn to £29 bn for the additional beds required under our central scenarios.

This is an indicative estimate, designed to stimulate and inform debate, and the following caveats apply:

- the cost of a hospital varies widely depending on numerous factors
- the NHS may add beds to existing sites rather than build new hospitals
- hospital building can be subject to cost overruns
- more specifically, recent inflation may significantly increase construction costs
- the NHS may want to explore alternatives to bricks and mortar solutions, such as virtual wards.

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*Based on 146 acute trusts in England

REAL Centre Projections: G&A hospital beds in England (2018–2030)

Indicative cost of additional G&A beds

We estimate the cost of the additional beds needed to keep up with demand could be between £17bn and £29bn by 2030/31

	Fast fall in time in hospital	Slow fall in time in hospital
Number of beds	23,000	39,000
Average size of hospital (beds)	609	609
Number of hospitals	38	64
Cost per hospital	£450m	£450m
Total cost	£17bn	£29bn

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Source: REAL Centre calculations based cost estimates from existing hospital building programmes (Health Infrastructure Plan). • Average size of hospital is based on median number of general & acute overnight and day only beds in NHS hospitals

6 Conclusions

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Conclusions

Following years of falling bed supply, the NHS in England will see pressure to increase the number of hospital beds over the coming decade to keep up with demand. Improvements in care can help moderate these pressures but may become harder to achieve.

In recent decades England has seen a decline in the number of general and acute hospital beds, yet the NHS was still able to deliver more care as this was offset by a fall in the time patients spend in hospital. However, England had one of the shortest lengths of stay in the OECD in 2018 and rising hospital bed occupancy before the COVID-19 pandemic suggests the bed base was already insufficient to meet demand.

The REAL Centre projects a rise in health care demand over the next decade, reflecting a growing and ageing population with more complex needs. Under our central scenarios – where time spent in hospital continues to fall but at a slowing rate – meeting this demand would require an additional 23,000–39,000 beds if 2018/19 rates of care are to be maintained. An indicative estimate of the cost is £17bn to £29bn for the DHSC capital budget.

Such a large rise represents a sharp deviation from the recent trend. It is also a far larger increase in bed supply than we would expect under the Health Infrastructure Plan. The NHS may seek alternatives, for instance by pursuing 'virtual ward' and 'hospital at home' models, although the efficacy of such schemes remains unclear. Increasing the hospital bed base may also help the NHS become more resilient to future health care shocks.

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Implications

Our projections indicate that a significant increase in the number of general and acute beds would be needed to deliver 2018/19 rates of care going forward. How could the NHS respond?

- Increase bed supply - Our central projections suggest 23,000–39,000 additional general and acute beds would be needed over the next decade.
- Do things faster – Continued reductions in the time spent in hospital can help alleviate the upward pressure on beds. Our central projections allow for a continued fall but at a slower rate; if the NHS can deliver even faster improvements then it will be able to meet demand with fewer beds.
- Do things differently – Our projections are based on the 2018/19 model of care, but the NHS may look to do things differently. For instance, by expanding potential substitutes for hospital beds such as virtual wards or nursing home beds.
- Do less – As above, our projections are based on a given rate of care, but the NHS may want to do less. This could be by better meeting patient need, for instance investing in primary care, improving care coordination and increasing prevention to reduce unnecessary hospital admissions; it could also mean simply delivering less of some services, either explicitly by changing thresholds or implicitly by reducing supply.

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