

MODELLING THE EFFECTS OF SMOKING ON HEALTHY LIFE EXPECTANCY IN ENGLAND

Pijper A¹, Chan MS¹, Xie P¹, Pearson-Stuttard J¹, Cairns A², Mayhew L³

- 1
 Health Analytics, Lane Clark & Peacock LLP, London, UK
- 2
 Heriot Watt University, Edinburgh, UK
- 3
 Bayes Business School, London, UK and International Longevity Centre, UK

Summary

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 The UK government has ambitious targets for reducing smoking and increasing healthy life expectancy, including banning all tobacco sales to anyone born after 2008.
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 We estimate that such a ban could increase life expectancy by 1.3 years and healthy life expectancy by 2.7 years in England, with greater gains in more deprived areas, although the full extent of these gains would take decades to materialise.
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 If everyone in England quit smoking overnight, the estimated immediate gain in healthy life expectancy is 0.6 years, resulting from lighter mortality and morbidity for ex-smokers than current smokers.
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 Because of the strong geographical link between deprivation, smoking and healthy life expectancy, effective smoking intervention programmes will be needed to reduce health inequalities and smooth the transition to a tobacco-free society.

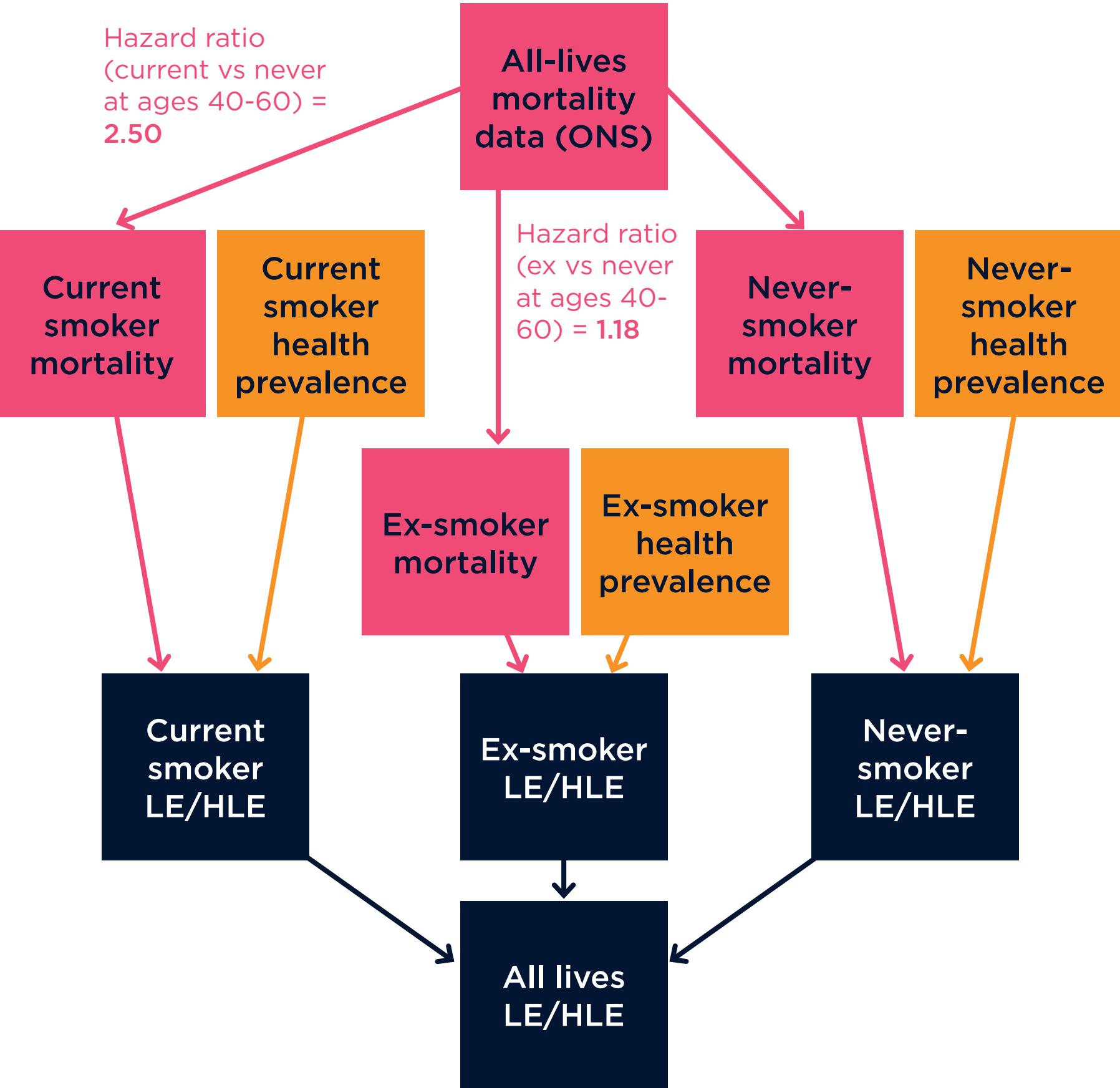
Background

- In October 2023, the UK government announced plans to create a “[smokefree generation](#)”, including introducing legislation to stop anyone born after 2008 ever legally being sold tobacco products.
- As part of its existing Levelling Up agenda, the government has a target of increasing Healthy Life Expectancy (HLE) by 5 years by 2035 and narrowing geographical inequalities in HLE.
- We analysed the geographical correlation between smoking and HLE and modelled the impact of a range of smoking interventions – including the smokefree generation policy – on life expectancy (LE) and HLE in England.

Methods

- We used the Sullivan life table method to estimate HLEs at a national and local level for the following cohorts:

- Current smokers
 - Ex-smokers
 - Never-smokers
 - All lives
- Local calculations were carried out across the 149 Upper Tier Local Authority (UTLA) areas in England.
- Mortality rates were split between cohorts using [published hazard ratios](#), and health prevalence rates by smoker status were obtained from the Office of National Statistics (ONS).



- We modelled a base case scenario using existing smoking prevalence rates and a series of intervention scenarios which adjusted these rates to reflect a given intervention or policy.
- One hypothetical intervention we modelled involved pairing UTLAs with similar geographic and demographic features but different smoking prevalence rates (e.g. Blackpool and Liverpool). We estimated the increase in LE/HLE in the UTLA with the higher smoking prevalence if its smoking rate were paired with the other UTLA, in which case the average improvement in both LE and HLE would be 0.1-0.2 years.

Results

- We found a strong link between deprivation, smoking prevalence and HLE:

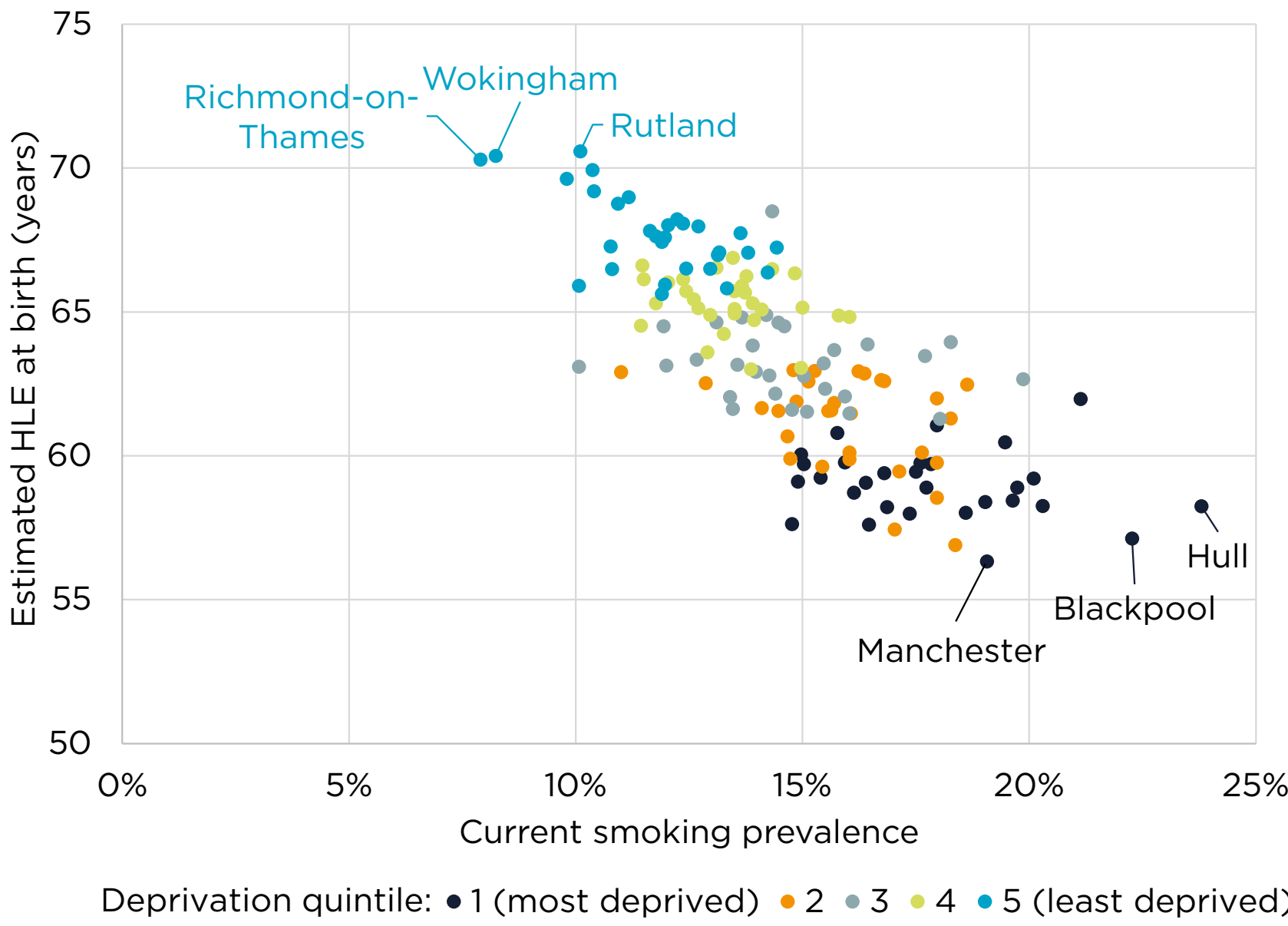


Figure 1. Smoking prevalence and healthy life expectancy at birth in upper-tier local authorities in England

- If everyone in the most deprived UTLA (Blackpool) quit smoking overnight, the modelled gain in Blackpool's HLE is just over 1 year. This gain reflects the difference between current and ex-smoker mortality and morbidity.
- More substantial gains in HLE are achievable over the long term if smoking prevention programmes can be successfully implemented, because never-smokers have lighter mortality and morbidity than current and ex-smokers. Figure 2 shows estimated changes in period LE and HLE under the smokefree generation policy*.

HLE could rise by over 2.5 years in England in the absence of smoking

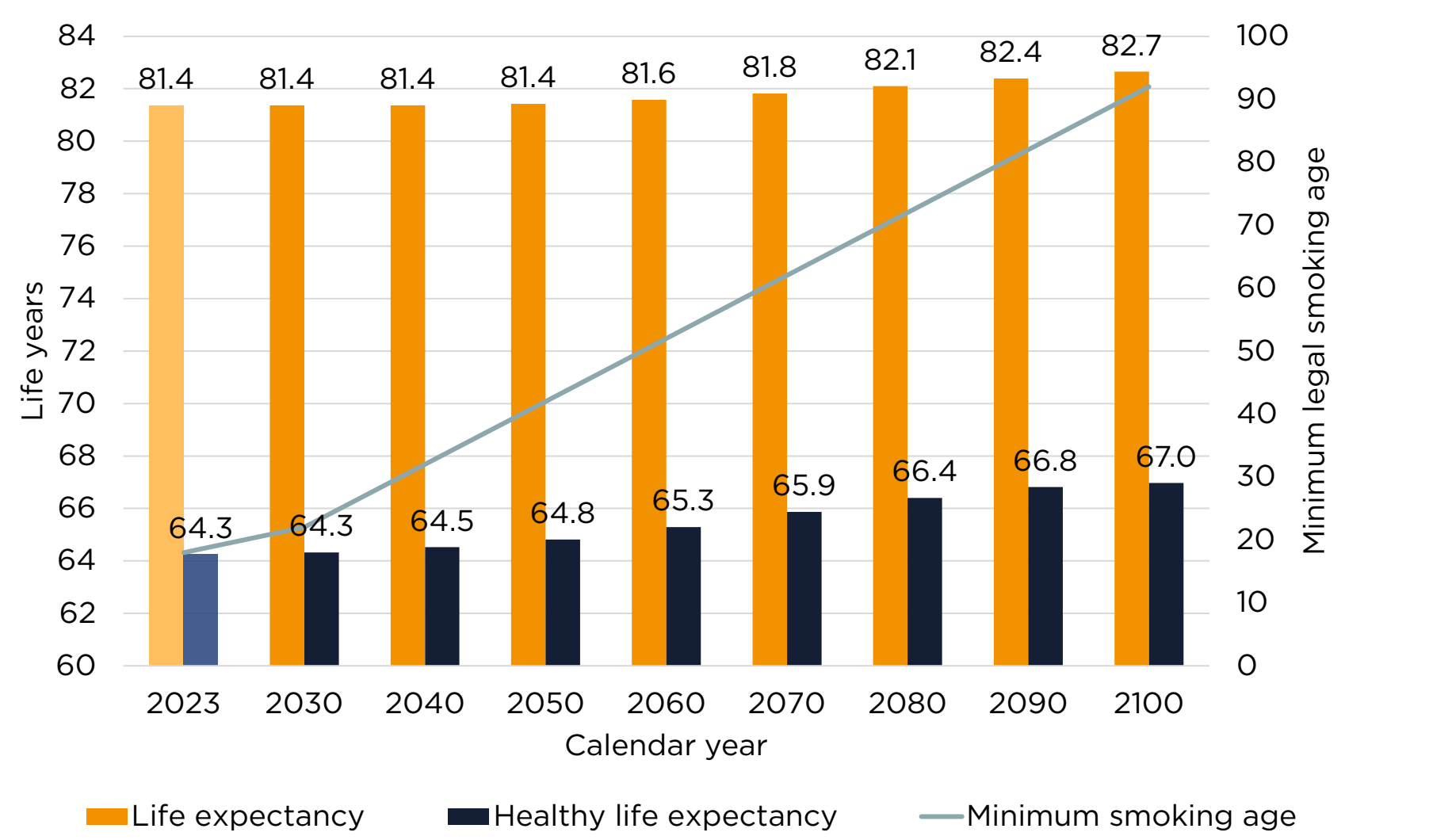


Figure 2. Estimated changes in period life expectancy and healthy life expectancy in England under the smokefree generation policy, ignoring all other drivers of mortality and morbidity

*These projections ignore other drivers of LE/HLE and assume that:

- The policy is 100% effective at preventing smoking in people born after 2008
- There is no change in smoking prevalence rates among people born in or before 2008

In Blackpool, the estimated increase in HLE is over 3.5 years

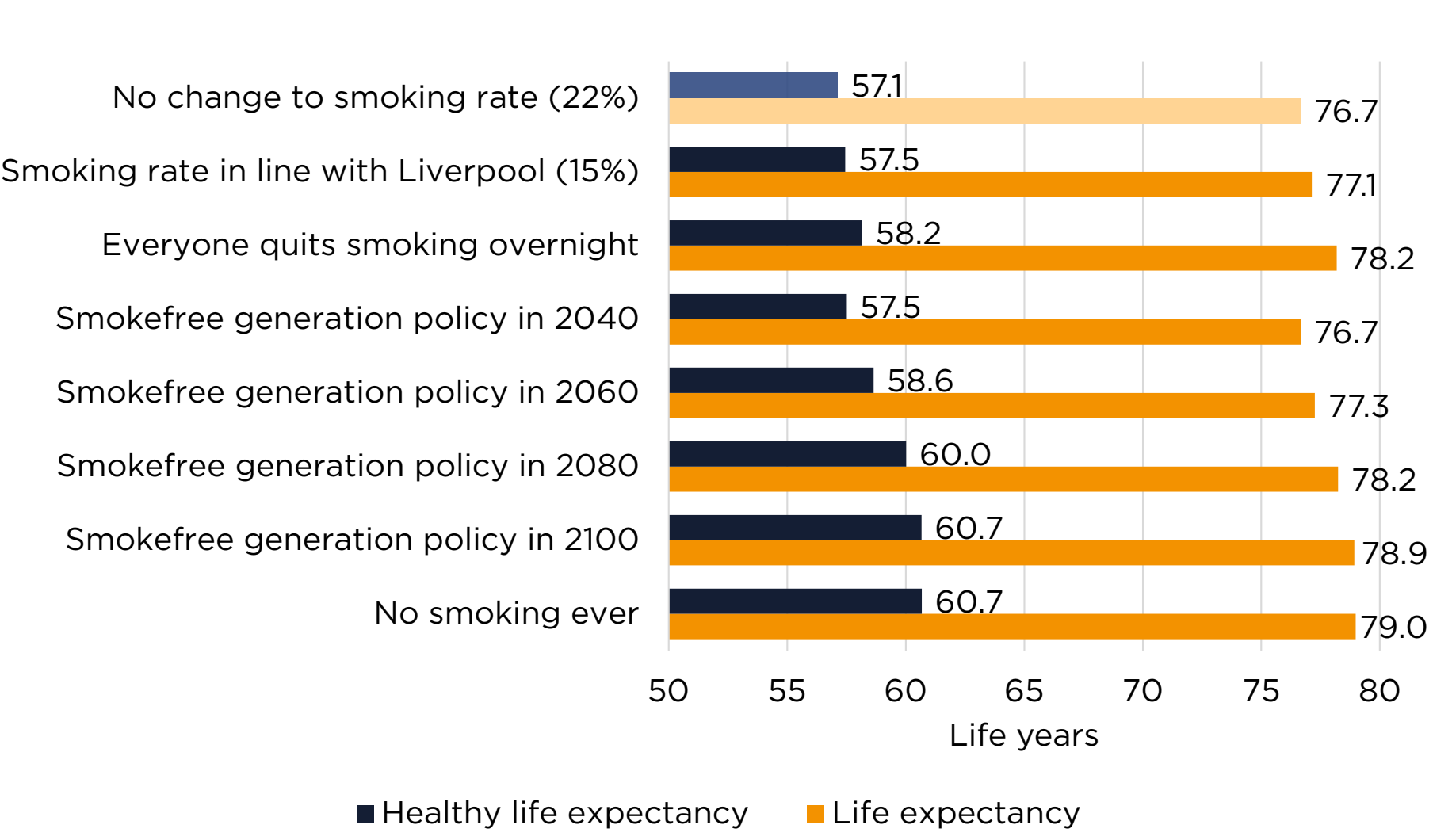


Figure 3. Estimated changes in period life expectancy and healthy life expectancy in Blackpool (most deprived UTLA) under different scenarios

Conclusions

- The link between deprivation, smoking and healthy life expectancy suggests that smoking intervention programmes have a role to play in reducing health inequalities.
- Successful implementation of the smokefree generation policy could increase national life expectancy by more than 1 year and healthy life expectancy by more than 2.5 years, although these gains would miss the government's target of improving HLE by 5 years.
- Immediate gains in HLE at the individual level are possible if ambitious action is taken to reduce smoking prevalence rates: never-smokers in England have an estimated HLE of 67.0 years, over 9 years higher than lifetime smokers (57.8 years).
- We recommend combining smoking interventions with broader action across the multiple drivers of poor health outcomes in the UK to achieve the government's ambitious HLE targets.

Further reading:

- Paper on smoking and levelling up led by Bayes Business School: <https://tinyurl.com/LevellingUpHLE>
- Paper on the harms and costs of smoking by the Royal College of Physicians: <https://www.rcplondon.ac.uk/projects/outputs/hiding-plain-sight-treating-tobacco-dependency-nhs>



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