



Institute  
and Faculty  
of Actuaries

## THE SCOTLAND EFFECT: IS THERE ONE AND WHY DOES IT MATTER?

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Susan Hanlon FFA

23 November 2017



### A FEW WORDS OF INTRODUCTION FROM THE WORLD OF PENSION CONSULTANCY

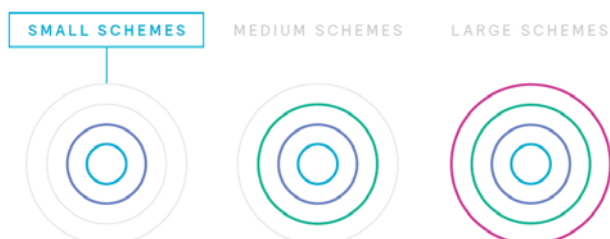
#### Prudence

- Fundamental to technical provisions
- Negotiated between funding parties – not specified by the Regulator
- Still need a best estimate starting point

#### Data

- Almost no underwriting data available
- Direct experience data limited for all but the largest of schemes.

#### Typical approaches



## THE SCOTLAND EFFECT IS THERE ONE AND WHY DOES IT MATTER?



NATIONAL  
STATISTICS



MERCER  
MODEL



WHAT ARE THE  
CAUSES?



WILL THE EFFECT  
PERSIST?



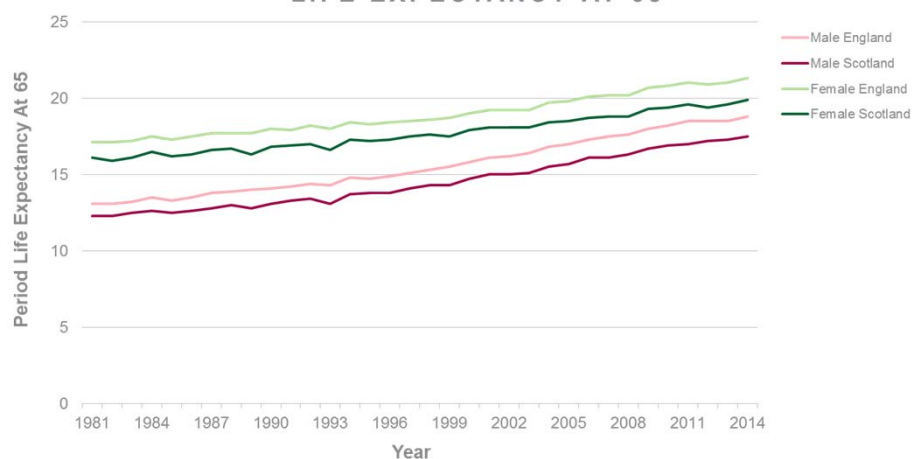
SO WHAT?

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## THE SCOTLAND EFFECT IS THERE ONE? NATIONAL STATISTICS

### LIFE EXPECTANCY AT 65



Source: Office for National Statistics, 2014-based principal projections

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## THE SCOTLAND EFFECT IS THERE ONE? MERCER MORTALITY MODEL

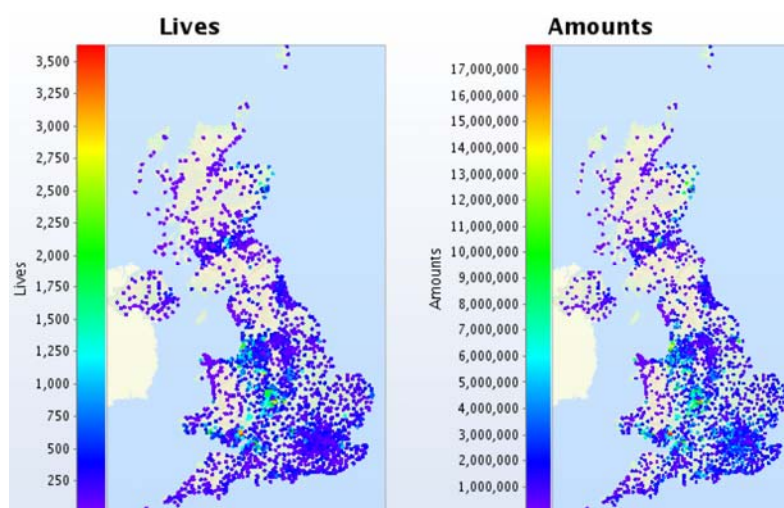
- 1 million records
- More than 4 million life-years of experience
- 15 years' data
- Good spread across both public and private sector clients
- 95% of records had a valid UK postcode



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## THE SCOTLAND EFFECT IS THERE ONE? MERCER MORTALITY MODEL



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## THE SCOTLAND EFFECT IS THERE ONE? MERCER MORTALITY MODEL

$$\mu_{x,y} = \frac{e^{\epsilon} + e^{\alpha + \beta x + \delta(y-2000)}}{1 + e^{\alpha + \beta x + \delta(y-2000)}}$$

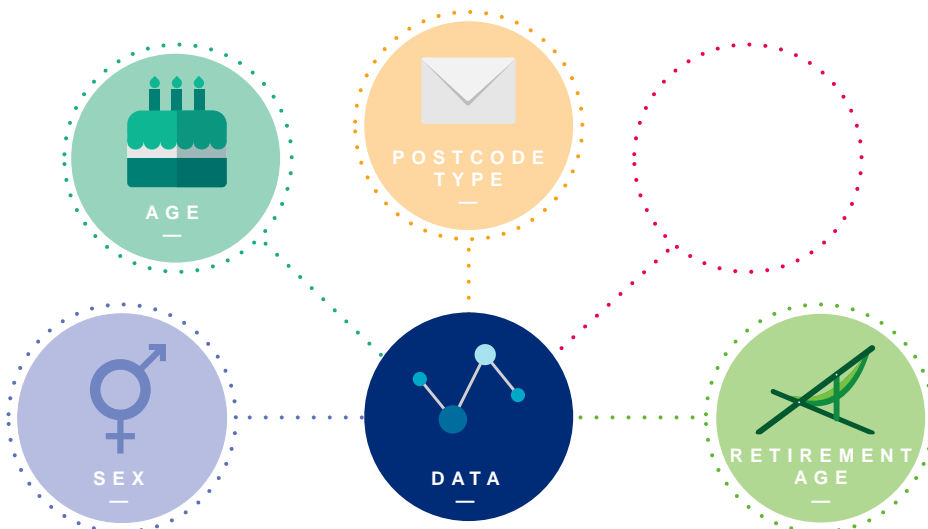


$$\alpha_i = \sum_j z_{i,j} \alpha_j \quad \beta_i = \sum_j z_{i,j} \beta_j$$

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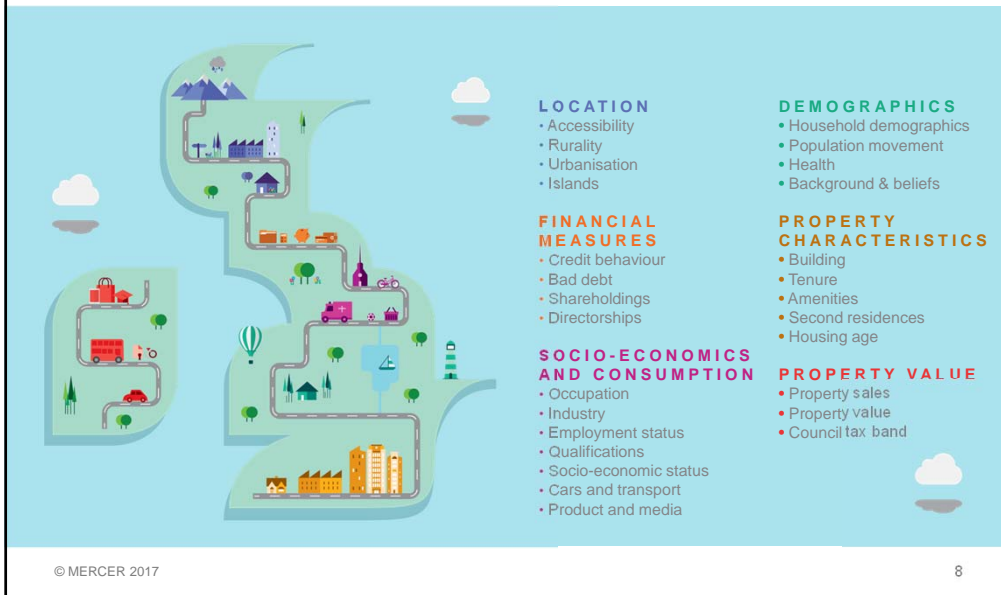
## THE SCOTLAND EFFECT IS THERE ONE? MERCER MORTALITY MODEL



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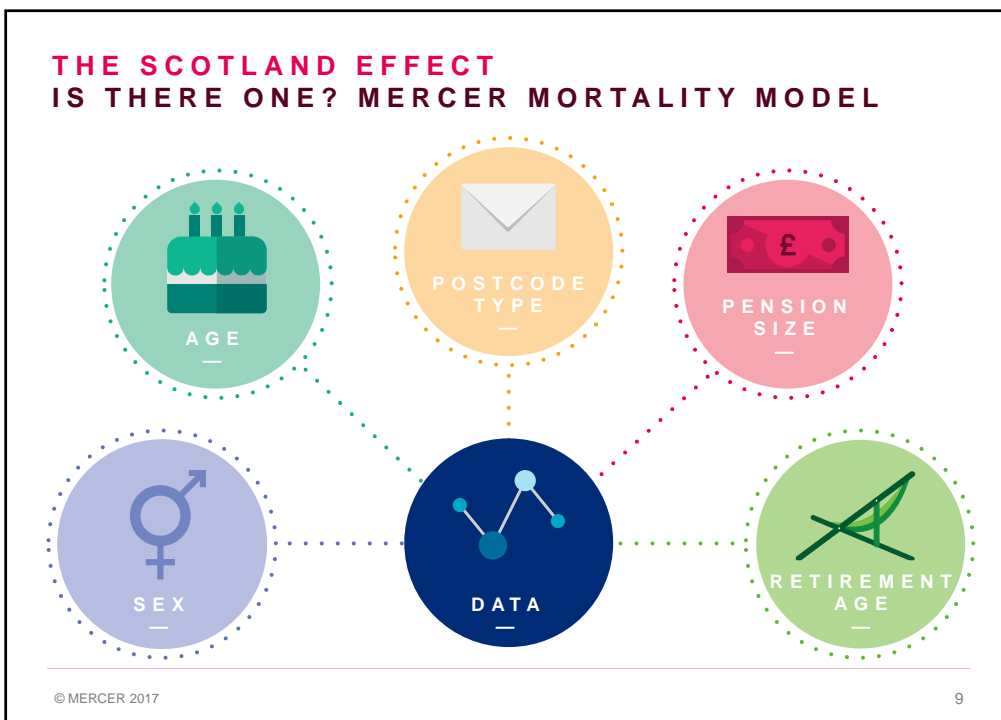
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## THE SCOTLAND EFFECT IS THERE ONE? MERCER MORTALITY MODEL

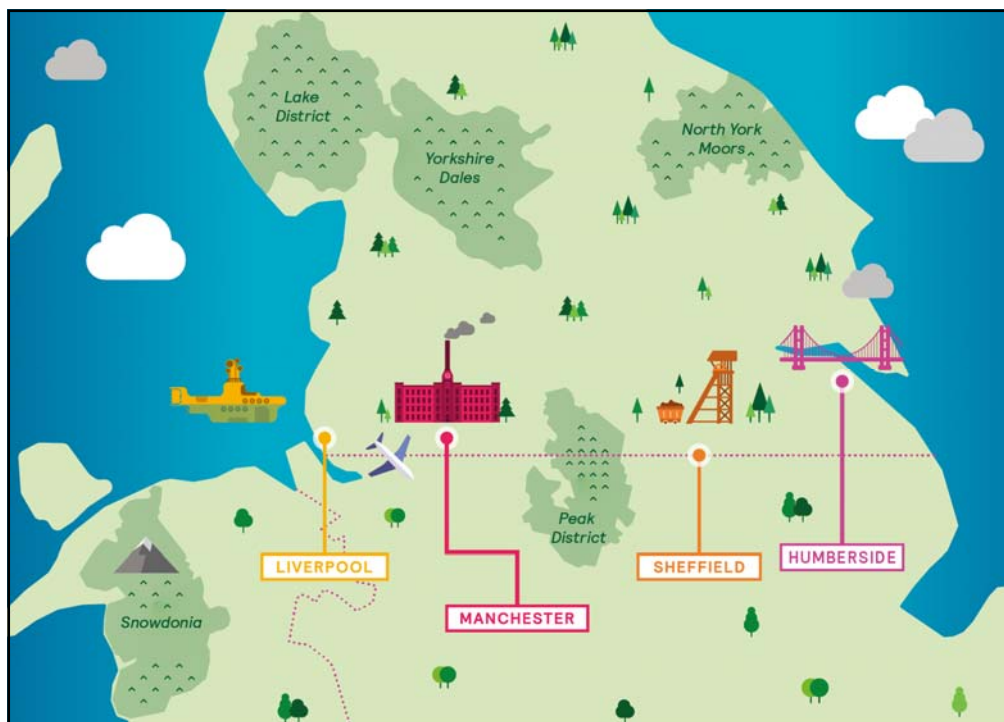
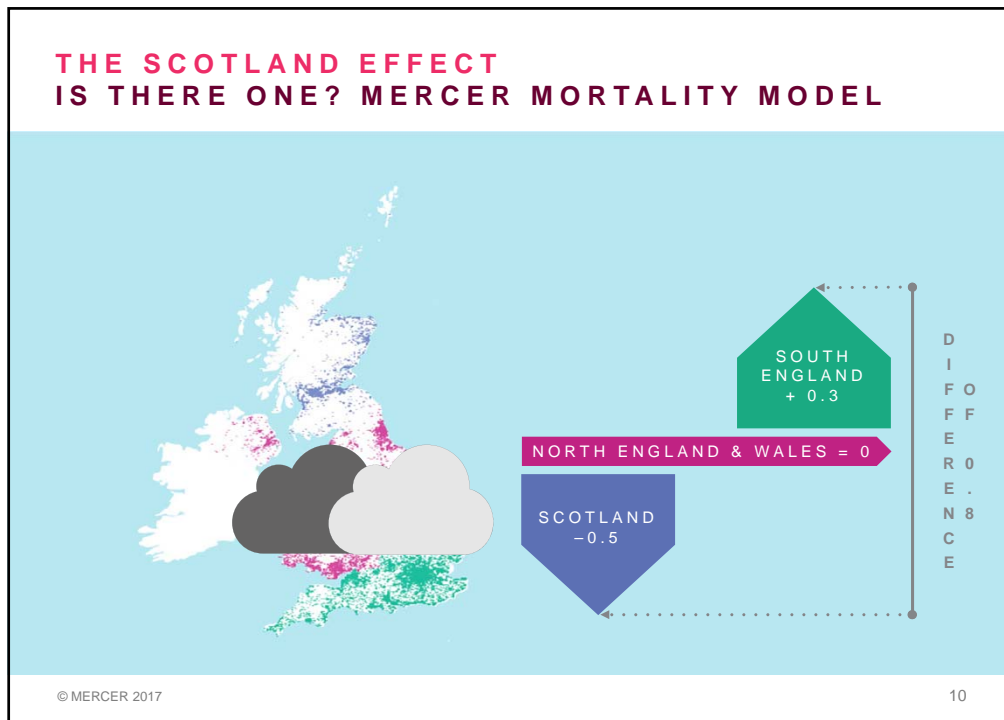


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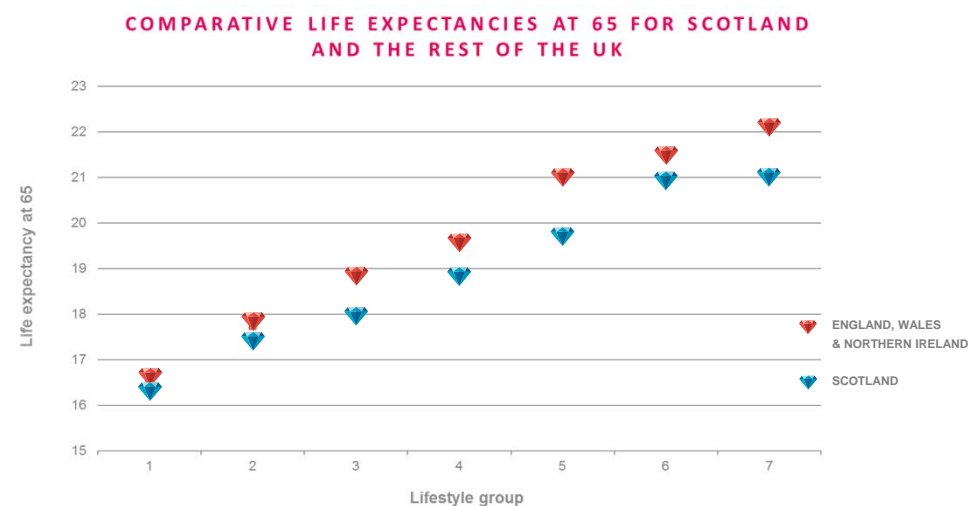
## THE SCOTLAND EFFECT IS THERE ONE? MERCER MORTALITY MODEL



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## THE SCOTLAND EFFECT IS THERE ONE? MERCER MORTALITY MODEL



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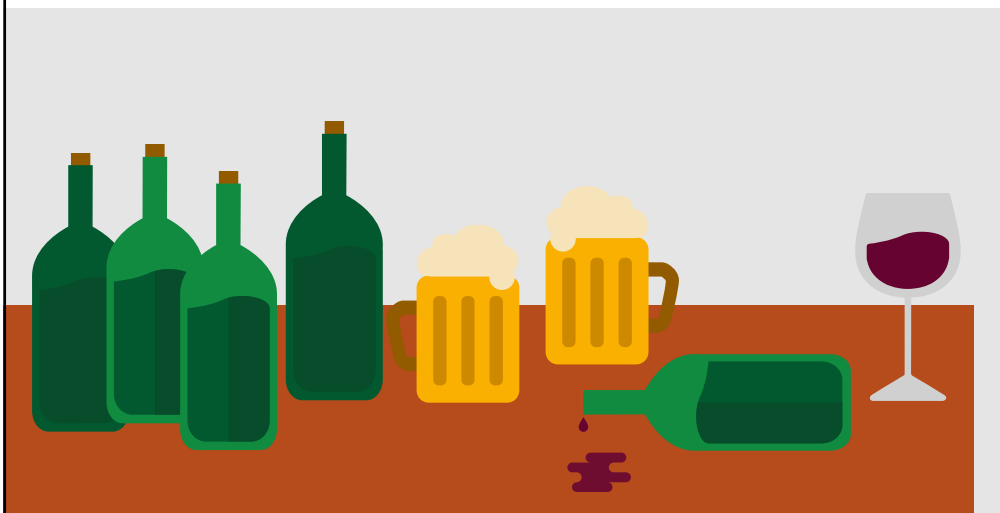
## THE SCOTLAND EFFECT WHAT ARE THE CAUSES? DIET



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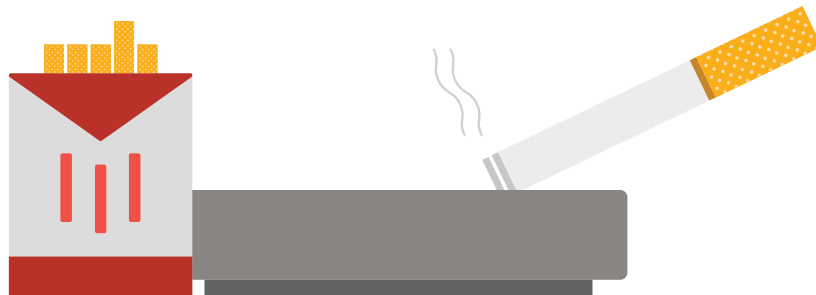
## THE SCOTLAND EFFECT WHAT ARE THE CAUSES? ALCOHOL



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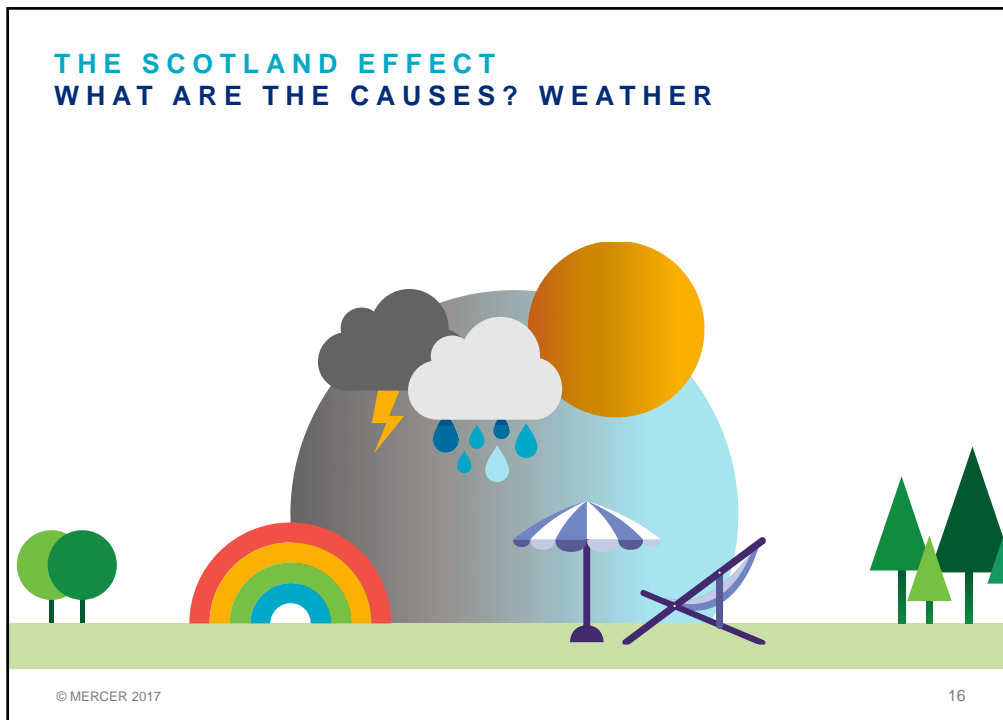
## THE SCOTLAND EFFECT WHAT ARE THE CAUSES? SMOKING



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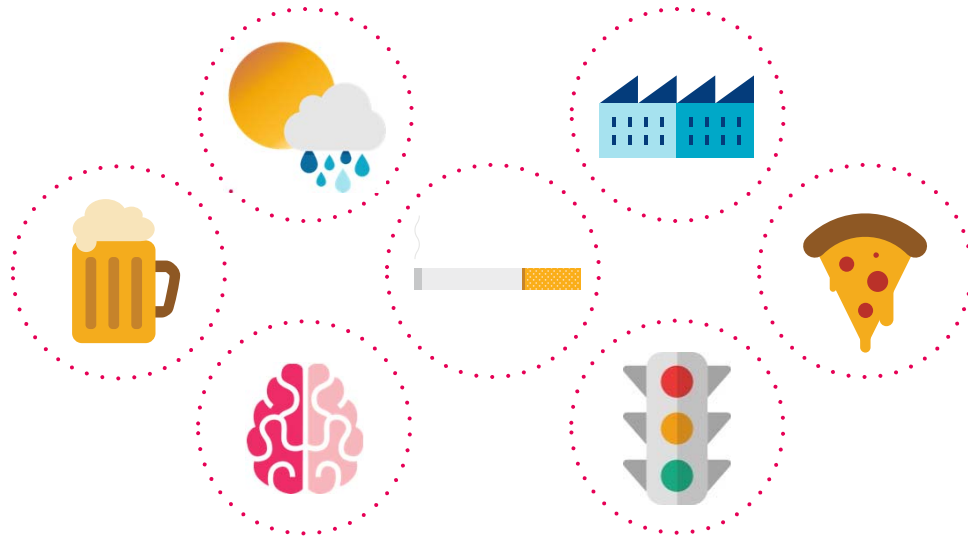
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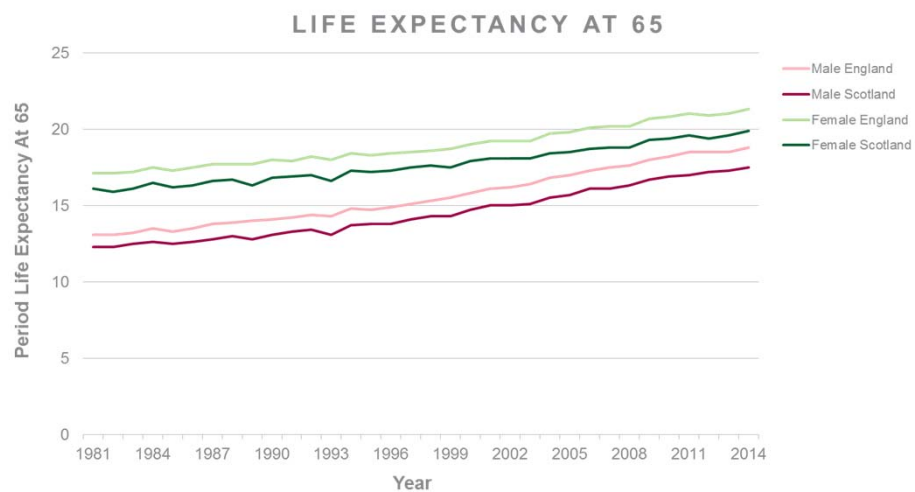
## THE SCOTLAND EFFECT WHAT ARE THE CAUSES?



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## THE SCOTLAND EFFECT WILL IT PERSIST?



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## THE SCOTLAND EFFECT SO WHAT?

### DOs and DON'Ts

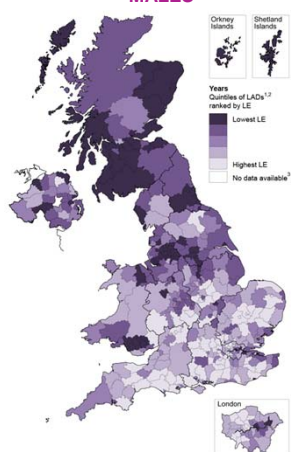
✗ Get distracted

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## THE SCOTLAND EFFECT SO WHAT?

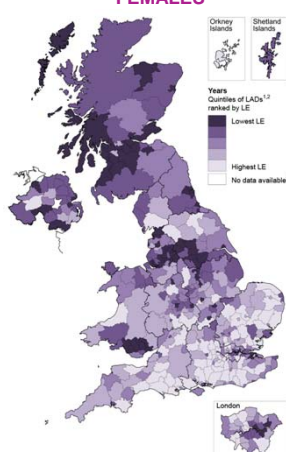
### MALES



¹ Local authority districts (LADs) include unitary authorities, London boroughs, metropolitan districts and non-metropolitan districts in England and Wales, council areas in Scotland and district council areas in Northern Ireland.  
² Each quartile comprises 81 LADs with the exception of the quartile with the lowest life expectancy, which has 80.  
³ Life expectancy figures are not available for City of London or Isles of Scilly because of small numbers of deaths and populations.

Source: Office for National Statistics.  
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### FEMALES



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Source:



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## THE SCOTLAND EFFECT SO WHAT?

### DOs and DON'Ts

- ✗ Get distracted
- ✓ Consider other factors
- ✗ Ignore it
- ✓ Assess the impact

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**Questions**

**Comments**

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